

GREAT BATTLES OF WORLD WAR TWO

Volume Three: War in the Air

- Building the Spitfire • Battle of Britain
- Inside the Luftwaffe • Kamikaze • Arnhem
- Blitz spirit • Pearl Harbor • V weapons
- Dambusters • Hiroshima AND MORE...



Find out more at
historyextra.com

Collector's Editions

BBC HISTORY MAGAZINE

BBC HiSTORY MAGAZINE

Save when you subscribe
to the digital edition



Available from



zinio™



EDITORIAL

Editor Jon Bauckham
jon.bauckham@immediate.co.uk
Editor (BBC History Magazine) Rob Attar
Production editor Rhiannon Davies
Art editor Sarah Lambert
Picture editor Katherine Mitchell
Picture consultant Everett Sharp
Additional work by Rob Blackmore, Michael Cocks, Rachel Dickens, Susanne Frank, Fay Glinister, Samantha Nott, Rosemary Watts

IMMEDIATE MEDIA^{CO}

BBC History Magazine is published by Immediate Media Company Bristol Limited under licence from BBC Studios who help fund new BBC programmes.

BBC History Magazine was established to publish authoritative history, written by leading experts, in an accessible and attractive format. We seek to maintain the high journalistic standards traditionally associated with the BBC.

PRESS AND PUBLIC RELATIONS

PR manager Emma Cooney 0117 300 8507
Emma.Cooney@immediate.co.uk

SYNDICATION

Director of licensing & syndication Tim Hudson
International partners' manager Anna Brown

PRODUCTION

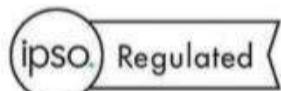
Production director Sarah Powell
Production co-ordinator Emily Mounter
Ad co-ordinator Florence Lott
Ad designer Julia Young

IMMEDIATE MEDIA COMPANY

Content director David Musgrave
Commercial director Jemima Dixon
Managing director Andy Healy
Group managing director Andy Marshall
CEO Tom Bureau

BBC STUDIOS, UK PUBLISHING

Managing Director, Consumer Products and Licensing Stephen Davies
Head of publishing Mandy Thwaites
Compliance manager Cameron McEwan
Chair, Editorial Review Boards Nicholas Brett
UK publishing coordinator Eva Abramik
(uk.publishing@bbc.com)



© Immediate Media Company Bristol Limited, 2020 – ISSN: 1469 8552

Not for resale. All rights reserved. Unauthorised reproduction in whole or part is prohibited without written permission. Every effort has been made to secure permission for copyright material. In the event of any material being used inadvertently, or where it proved impossible to trace the copyright owner, acknowledgement will be made in a future issue. MSS, photographs and artwork are accepted on the basis that *BBC History Magazine* and its agents do not accept liability for loss or damage to same. Views expressed are not necessarily those of the publisher.

We abide by IPSO's rules and regulations. To give feedback about our magazines, please visit immediate.co.uk, email editorialcomplaints@immediate.co.uk or write to Katherine Conlon, Immediate Media Co., Vineyard House, 44 Brook Green, London W6 7BT.

Immediate Media Company is working to ensure that all of its paper is sourced from well-managed forests. This magazine can be recycled, for use in newspapers and packaging. Please remove any gifts, samples or wrapping and dispose of it at your local collection point.

“ For many Britons, nothing quite sums up the nation's Second World War triumphs than stories of Spitfires taking to the skies, fending off the Luftwaffe against seemingly insurmountable odds.

Indeed, as we remember the **Battle of Britain** eight decades on, Winston Churchill's words still pack a powerful punch: “Never in the field of human conflict was so much owed by so many to so few.”

Yet Churchill's famous ode to 'the Few' only offers part of the picture. While the pilots of Fighter Command are rightly lauded, the battle was also won by the likes of aircraft engineers, radar operators and bomber crews, each doing their utmost to dash Hitler's hopes of invasion.

In this special edition of *BBC History Magazine*, we explore these pivotal moments during the war in the air and more, separating fact from fiction to provide a detailed portrait of the conflict.

From the planning of the **Dambusters raid** to the development of the **atomic bomb**, we examine the **advances in aviation** that took warfare to new heights, as well as the **moral dilemmas** they posed.

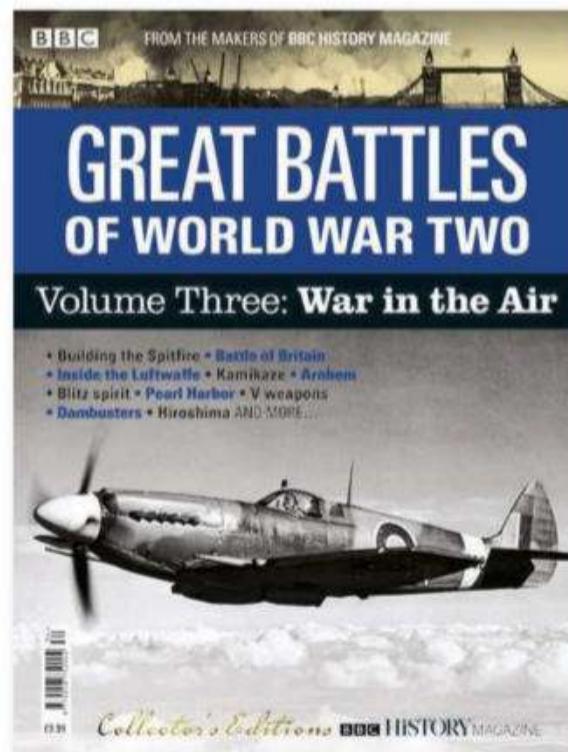
Crucially, we also climb inside the cockpit and investigate the human experience of war, revealing the plight of **female Luftwaffe pilots**, **American paratroopers** and even **Japanese kamikaze**, who – far from being brainwashed zealots – felt anger at their impending deaths.

Great Battles of World War Two: War in the Air is the final volume of a three-part series, following the publication of *Land Battles* and *War at Sea* earlier this year. Like its predecessors, it contains newly commissioned features along with carefully updated versions of articles that have previously appeared in *BBC History Magazine*.

It has been a pleasure to put this trilogy together, and I hope you find each volume to be a worthy addition to your bookshelf.

Jon Bauckham

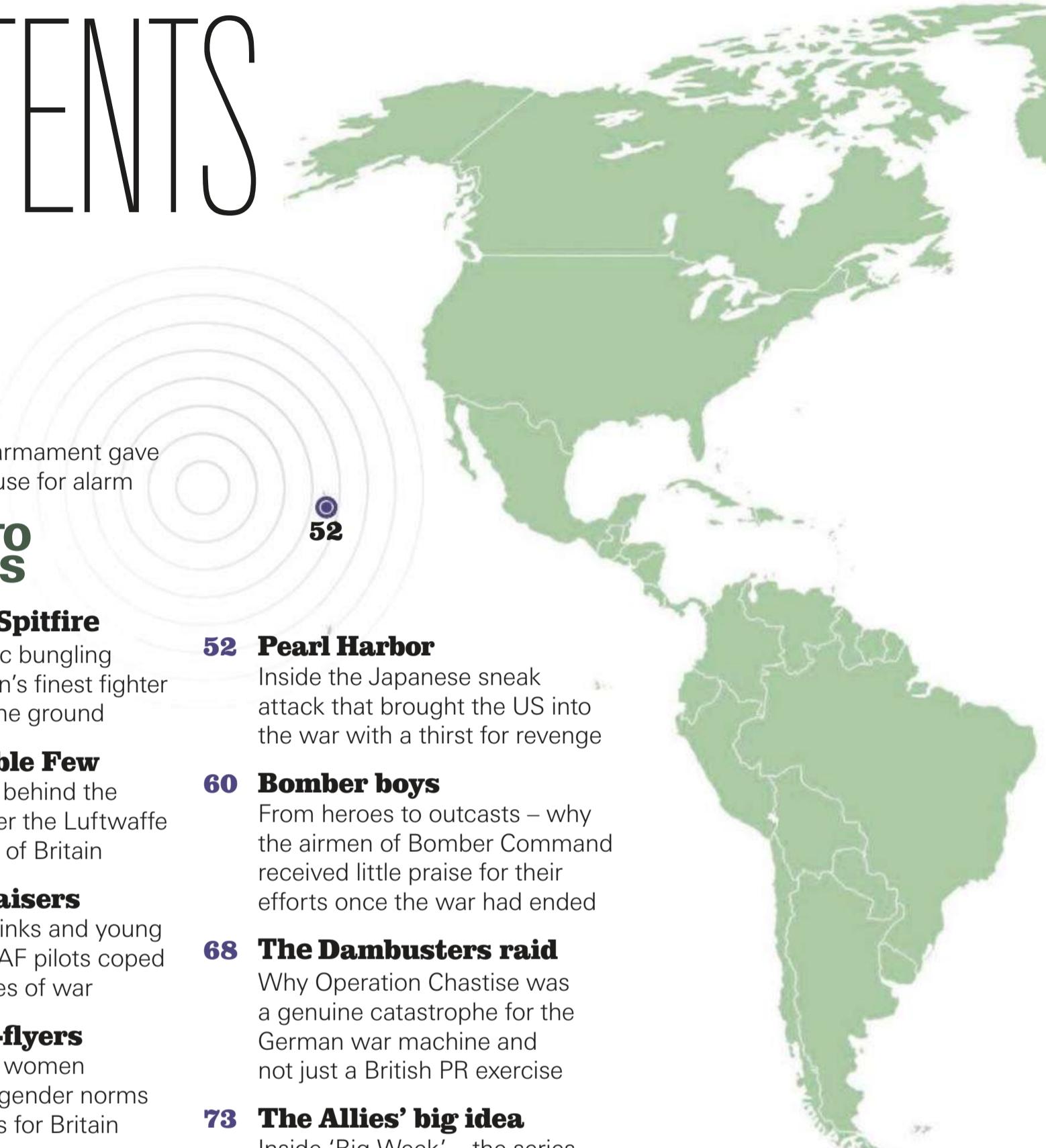
Editor



“ Civilians died not just because of poor housing and shelter, but because they took the risk of defying the bombs rather than kowtow to Hitler”

RICHARD OVERY reveals why British stoicism cost the lives of countless civilians during the Blitz on page 46

CONTENTS



6 Introduction
Why German rearmament gave 1930s Britain cause for alarm

8 TAKING TO THE SKIES

10 Building the Spitfire
How bureaucratic bungling nearly kept Britain's finest fighter plane down on the ground

16 The formidable Few
The real reasons behind the RAF's victory over the Luftwaffe during the Battle of Britain

22 Flying hell-raisers
Fast cars, stiff drinks and young women – how RAF pilots coped with the pressures of war

26 Female high-flyers
Meet the defiant women who challenged gender norms and flew Spitfires for Britain

30 The view from below
How civilians reacted as the Battle of Britain played out above their heads

34 Breaking the Luftwaffe
Why the previously mighty German air force ended up as a shadow of its former self

42 An extraordinary life
The story of Melitta Schiller von Stauffenberg: the Jewish pilot who flew for Germany, not Hitler

44 FIGHT AND FLIGHT

46 Dangers of the Blitz spirit
Why British stoicism caused civilian casualties to skyrocket as the German bombs rained down

52 Pearl Harbor
Inside the Japanese sneak attack that brought the US into the war with a thirst for revenge

60 Bomber boys
From heroes to outcasts – why the airmen of Bomber Command received little praise for their efforts once the war had ended

68 The Dambusters raid
Why Operation Chastise was a genuine catastrophe for the German war machine and not just a British PR exercise

73 The Allies' big idea
Inside 'Big Week' – the series of bombing raids that saw the Allies seize superiority in the skies of north-western Europe

78 THE FINAL DESCENT

80 The risks of D-Day
Why the Allies gambled the lives of thousands of airborne troops to gain a foothold in Normandy

86 Hitler's secret weapon
Behind the Nazis' last-ditch attempt to break Britain with rockets and flying bombs

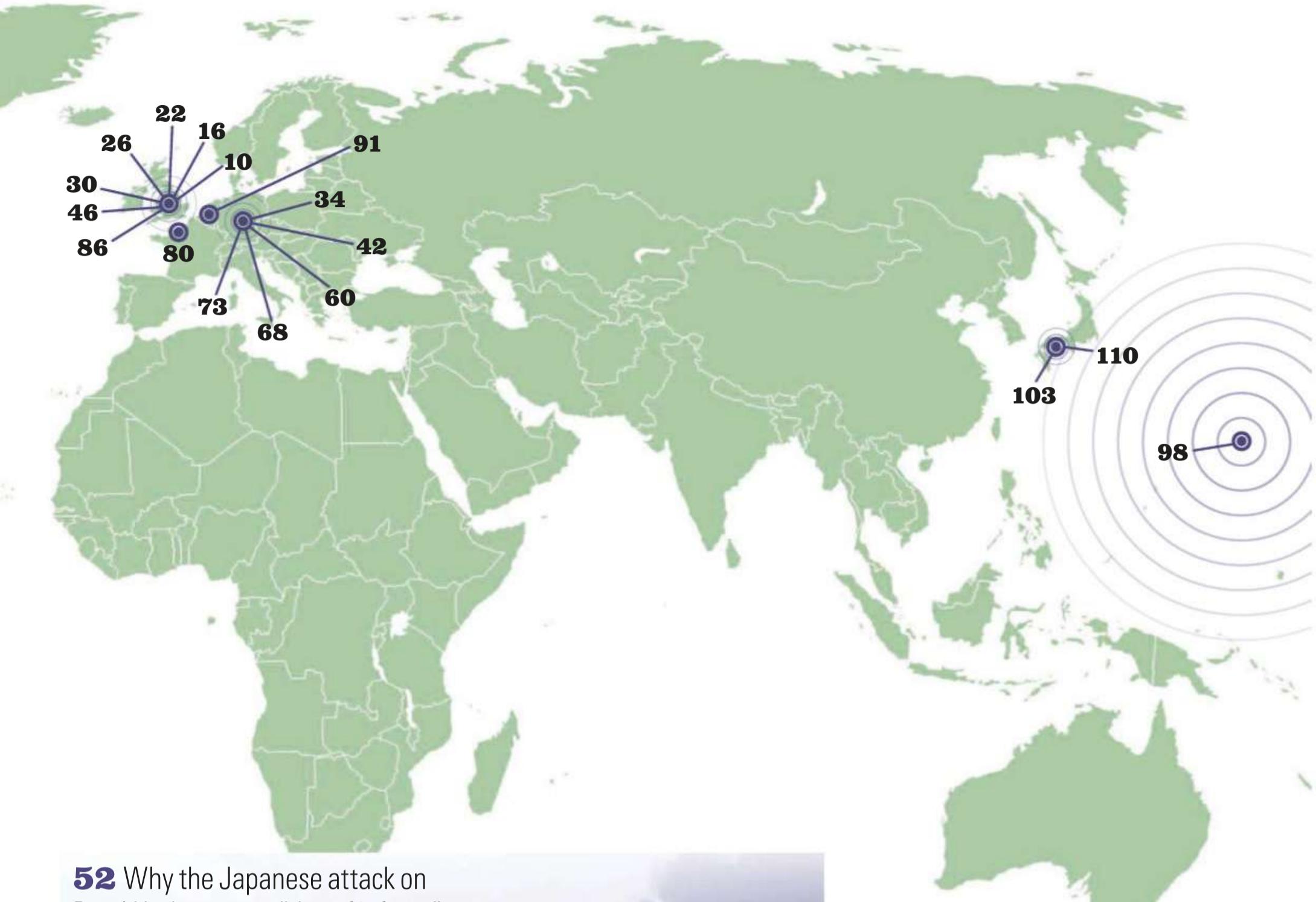
91 Disaster at Arnhem
The raging egos, poor planning and flawed ideas that meant Operation Market Garden was doomed to fail

98 The reluctant kamikaze
Why many of these infamous Japanese pilots viewed their looming deaths as a tragedy

103 The road to Hiroshima
Behind the scientific discoveries that led to the US dropping the world's first atomic bomb

110 Nuclear morality
Was it right to drop the bomb? Seven historians have their say on this deeply divisive question

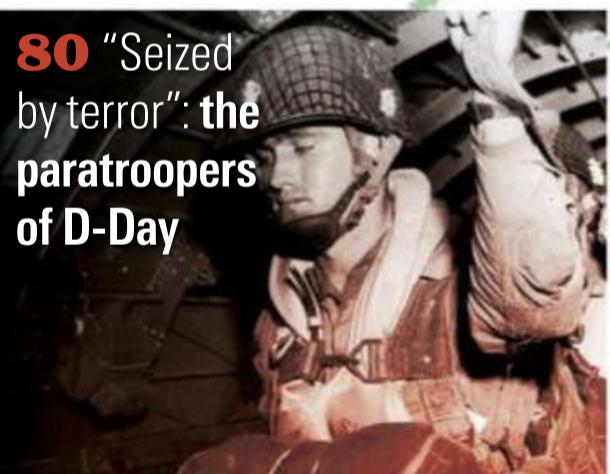
114 Opinion
James Holland considers the importance of tactical air power



52 Why the Japanese attack on Pearl Harbor was a “day of infamy” that **changed the US forever**



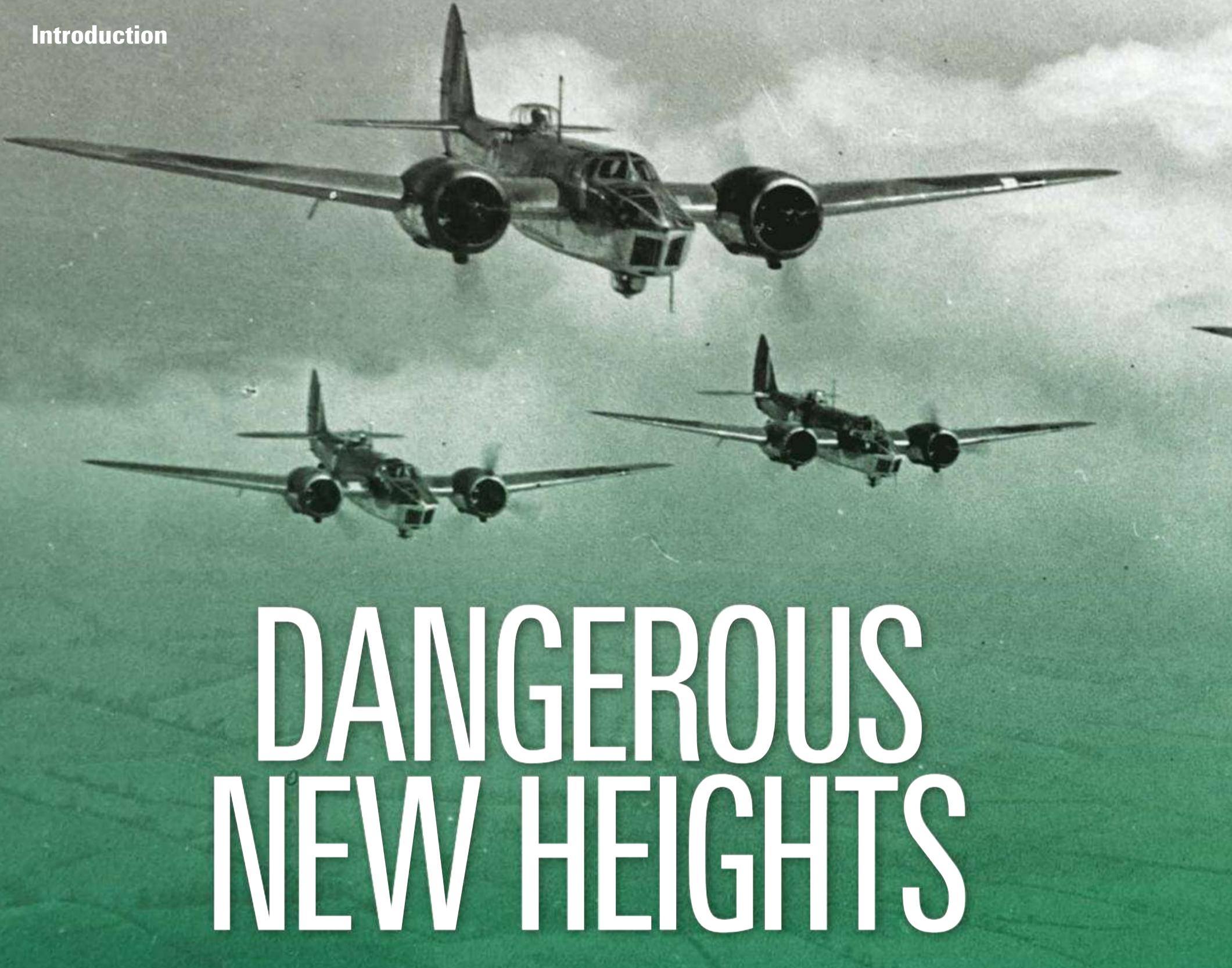
GETTY IMAGES/AKG IMAGES



80 “Seized by terror”: **the paratroopers of D-Day**



34 How the rapacious Nazis ultimately crippled the **Luftwaffe**



DANGEROUS NEW HEIGHTS

Six weeks after Adolf Hitler had been sworn in as Germany's chancellor, Winston Churchill issued a stark warning to parliament. For a year, Churchill had been a lone voice against the cross-party support for disarmament, and in a speech to the House of Commons on 14 March 1933, he lamented the details of the recently published British Air Estimates.

The report had revealed that Britain was only the world's fifth-biggest air power, a ranking that would not improve now that the nation's 10-year aircraft manufacturing programme had been suspended for another year. Churchill was incredulous that not one aircraft had been built during the first three months of 1933, and he felt compelled to warn his colleagues: "We should be well advised to concentrate upon our air defences with greater vigour."

Churchill's warning went unheeded. As rumours grew that Nazi Germany had embarked upon a rearmament programme – against the terms of the 1919 Versailles

BRITAIN MAY HAVE THOUGHT ITSELF SAFE BECAUSE OF ITS GEOGRAPHICAL GOOD FORTUNE, BUT CHURCHILL URGED PARLIAMENT TO THINK AGAIN

Treaty – Britain still dreamt of peace.

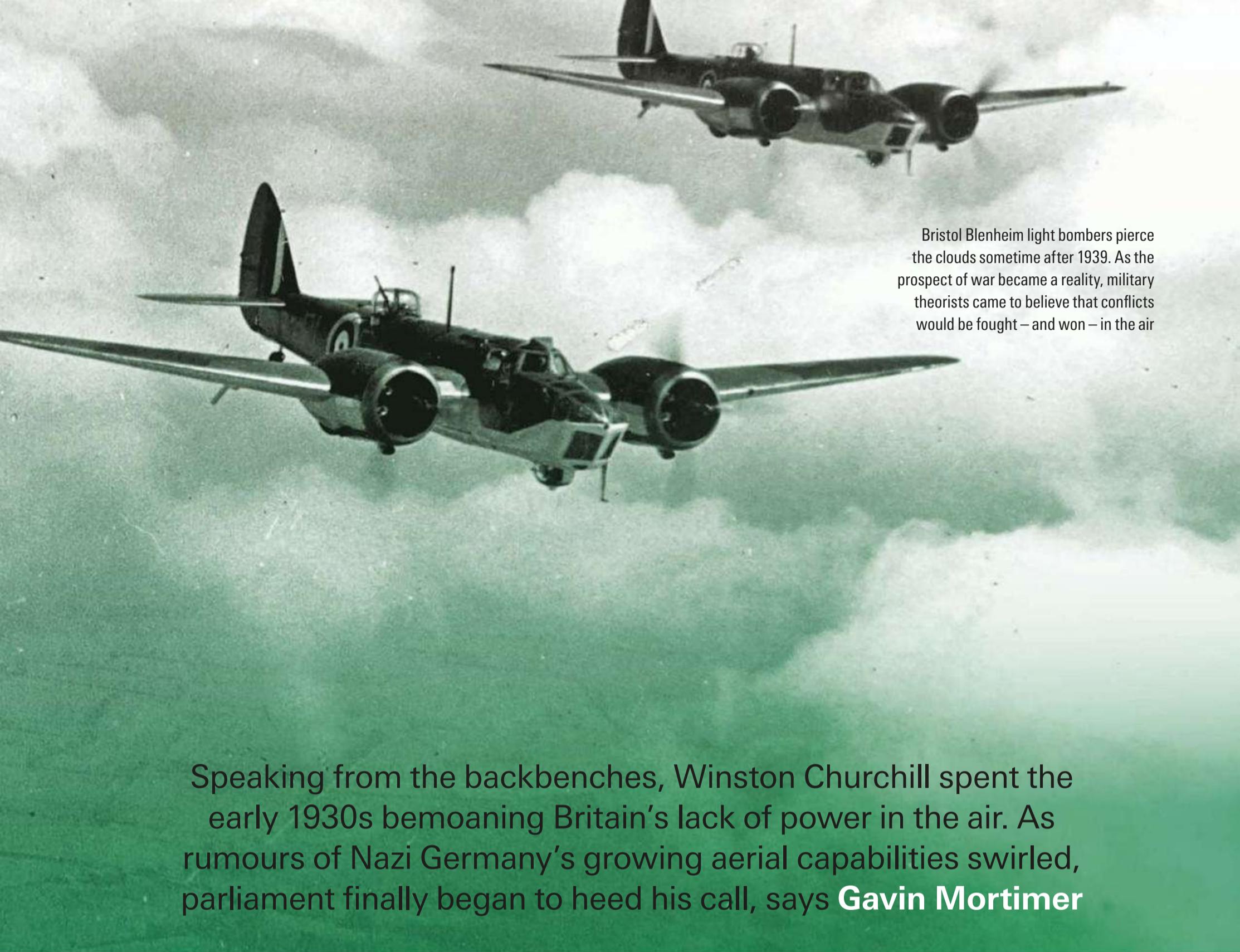
"Wars come very suddenly," said Churchill on 7 February 1934, reminding colleagues that 20 years earlier, war had engulfed the world in a matter of weeks. Britain may have thought itself safe because of its geographical good fortune, but he urged them to think again. "This cursed, hellish invention and development of war from the air has

revolutionised our position," he thundered. "We are not the same kind of country we used to be when we were an island."

Churchill had to wait another year before his words had an effect, by which time Hitler had appointed Hermann Göring as the commander of the Reich Luftwaffe. On 4 March 1935, *The Manchester Guardian* reported on Britain's "new expansion plans for its army, navy and air force... the emphasis on air defence follows fears that Britain is an easy target for cross-Channel air raids."

In justifying the policy shift, Prime Minister Stanley Baldwin conceded that "our attempt to lead the world towards disarmament by unilateral example has failed". Proof of the failure came three weeks later when, in Churchill's words, Hitler boasted that "the German air force had already reached parity with Great Britain". Soon afterwards, the Messerschmitt Bf 109 made its maiden flight and proved itself superior to every other fighter.

Britain was determined to make up for the wasted years, and two fighters of its own



Bristol Blenheim light bombers pierce the clouds sometime after 1939. As the prospect of war became a reality, military theorists came to believe that conflicts would be fought – and won – in the air

Speaking from the backbenches, Winston Churchill spent the early 1930s bemoaning Britain's lack of power in the air. As rumours of Nazi Germany's growing aerial capabilities swirled, parliament finally began to heed his call, says **Gavin Mortimer**

went into production, the Hawker Hurricane and the Spitfire. Also taking shape was a strategic bomber force comprising 90 squadrons. In total, explained a Defence White Paper in 1936, the Royal Air Force wanted 124 squadrons and 1,736 aircraft, and to satisfy these demands, the RAF Volunteer Reserve was established.

In September 1939, Britain had a bomber force of 600, twice that of France, but less than half that of Germany. Nonetheless, the Luftwaffe's chief of staff, Hans Jeschonnek, had already recognised that their advantage could soon be overtaken by nations whose raw materials and manpower was superior.

"Do not let us deceive ourselves, gentlemen," he told a meeting of senior inter-services officers in May 1939. "Each country wants to outstrip the other in air armament. But we are all roughly at the same stage. In the long run a technical lead cannot be maintained." Thus, said Jeschonnek, Germany had to win the tactical war. "By concentrating our thoughts in this direction, we could win a real superiority over the enemy."

The US had the economic might to dwarf Germany's output, but in terms of military aviation strategy, it lagged behind the Nazis in the 1930s. A year after the end of the First World War, the US Army Air Service had reduced its officers from 20,000 to 200. Brigadier General Billy Mitchell, their wartime commander, fought against the scepticism of the army and navy in the interwar years, adamant that aerial warfare would decide future conflicts; like the RAF theorists, Mitchell believed that strategic bombing would be key in destroying the enemy's 'vital centres'.

Japan shared Germany's belief in winning the tactical war in the air, conscious that like the Nazis, they were hamstrung by a finite supply of raw materials and new pilots. If the Stuka dive bomber was the Luftwaffe's great innovation of the 1930s, for Japan it was most certainly the torpedo bomber – particularly its Mitsubishi G3M with its unrivalled range of 2,700 miles. This was exploited to devastating effect in 1937 when it led the bombing of China

during the Second Sino-Japanese War.

When the Japanese attacked Pearl Harbor in December 1941, much of the damage was inflicted by the Aichi dive bomber. Like the Stuka, which had led the German air assaults in the invasion of Poland, the Aichi heralded a new age in aerial warfare, a fact outlined by Prime Minister Neville Chamberlain in a letter to Churchill on 16 September 1939.

"The lesson of the Polish campaign is the power of the [German] Air Force, when it has obtained complete mastery in the air, to paralyse the operations of land forces," he wrote. "Accordingly, absolute priority ought to be given to our plans for rapidly accelerating the strength of our Air Force."

The age of the battleship was over, as Churchill had told parliament in 1934, and as he had foreseen, the "hellish" age of the bomber had arrived. ■

Gavin Mortimer is a historian and author. His books include *The Men Who Made the SAS* (Constable, 2015) and *Guidance from the Greatest* (Constable, 2020)

PART ONE

TAKING TO THE SKIES

 Britain was not alone, nor dependent on just a handful of men in Spitfires. It was a leading superpower 

Winston Churchill observes as a Short Stirling heavy bomber takes off from Cambridgeshire, June 1941. Alarmed by German rearmament in the 1930s, the statesman had long been eager to boost Britain's power in the air



Taking to the skies Spitfire



British innovation

Spitfires under construction at

the Vickers Supermarine works

in Southampton, around 1940

RIGHT The streamlined design
and elliptical wings of the Spitfire
allowed it to reach much higher
top speeds than its predecessors

HOW THE SPITFIRE NEARLY MISSED ITS FINEST HOUR



Adored by its pilots and feared by the Germans, the Spitfire is rightly seen as the greatest British fighter ever built. However, as **Leo McKinstry** reveals, bureaucratic bungling meant that this iconic aircraft nearly remained on the ground

Taking to the skies Spitfire

At the height of the battle of Dunkirk in May 1940, the brilliant New Zealander Al Deere was on patrol in his RAF Spitfire over the French coast. Suddenly, through the haze of smoke drifting upwards from the raging combat on the ground, he spotted a German Messerschmitt Bf 109 fighter below him. He instantly gave chase. Soon, both planes were descending earthwards at high speed. "Down we went, throttles fully open, engines roaring and each determined to get the last ounce out of his straining aircraft. From 17,000 feet down to ground level I hung to his tail," recalled Deere.

Desperate to shake off the Spitfire, the Bf 109 dramatically changed course, leveling out from his dive and then going into a steep climb. But Deere could not be beaten. "I continued to close range until at about 15,000 feet I judged that I was near enough to open fire. A long burst produced immediate results. Bits flew off his aircraft." Moments later, Deere watched the Bf 109 plunge into a field near Saint Omer and "explode with a blinding flash".

Engagements like this were typical of the Spitfire's formidable combat performance during the retreat from Dunkirk. The battle was the first time during the war that the plane had engaged the Luftwaffe in significant numbers, and the results shook the Germans, undermining their belief in their own invincibility. The effectiveness of the Spitfire was demonstrated even more graphically in the months that followed, as the aircraft played a central, heroic role in the defeat of the Luftwaffe during the Battle of Britain (see page 16). Adored by its pilots and feared by the Germans, it grew into an



War approaches

Mk 1 Spitfires being flown in formation by No 65 (East India) Squadron, May 1939

enduring symbol of British determination in the struggle against Nazi tyranny. The Vickers Supermarine Spitfire is rightly seen as the greatest British fighter ever built, an inspiring blend of elegance, power and speed. So successful was the plane that over 22,000 were manufactured in 19 different marks and 52 variants, with production lasting right up to 1948.

Strategic indifference

Yet perhaps the most remarkable aspect of the Spitfire story, rarely told before, is that the aircraft was almost sidelined by the government before 1940. With hindsight it is astonishing to find that the fighter, which developed into as great an icon of national resistance as Winston Churchill himself, was regarded in the Air Ministry with disdain at the outbreak of war. Some saw it as a stop-gap until the arrival of supposedly more

powerful fighters. Others viewed it as little more than a commercial venture for raising revenue from exports.

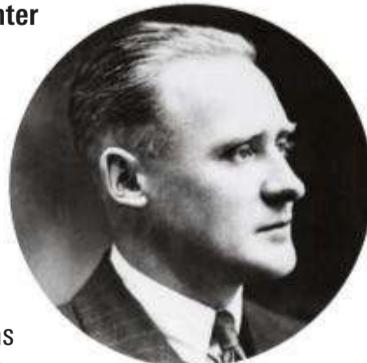
As early as 1938, barely two years after the Spitfire prototype had flown, the plane was described by a senior figure in the Ministry as "obsolete". A few months later, Chief of the Air Staff Sir Cyril Newall was trumpeting the virtues of the twin-engine Westland Whirlwind prototype, which he claimed represented "a considerable advance" on the Spitfire. In the same vein, the Air Ministry discussed at the start of 1940 the possibility of phasing out the manufacture of the Spitfire at the main Supermarine plant in Southampton, switching production instead to the Bristol Beaufighter. It now seems incredible, looking back on the period up to March 1940, to see how little the Spitfire featured in the Air Staff's long-term thinking. The main aim appeared to be to reduce

TIMELINE The making of an icon

October 1931

The Air Ministry issues specification F7/30, calling for a new day and night fighter to replace the ageing Bristol Bulldog.

Supermarine's chief designer, RJ Mitchell, comes up with an all-metal monoplane, the Type 224. Though not a success, the lessons learned lead to the creation of the Spitfire.



RJ Mitchell (1895–1937), designer of the Spitfire

5 March 1936

The maiden flight of the only Spitfire prototype, K5054, takes place at Eastleigh near Southampton. "The handling qualities of this machine are remarkably good," writes Supermarine test pilot Joseph 'Mutt' Summers. The Air Ministry is so impressed that 310 are immediately ordered.

October 1938

After severe production difficulties and political crises, the Spitfire finally goes into service with the RAF. No 19 squadron, based at Duxford, is the first unit to receive the plane, and pilots are reportedly delighted with the new fighter.

16 October 1939

Spitfires go into combat against the Luftwaffe for the first time, when aircraft from 602 and 603 squadrons take on nine Ju 88 bombers over the Firth of Forth. At the first sight of the Spitfires, the Germans turn and try to escape across the North Sea. As one surviving German pilot later recalls, it was "not a pleasant experience".

The only prototype Spitfire, K5054, on a test flight in 1939



production numbers of the aircraft and promote foreign sales rather than burden the RAF with an unwanted fighter. In June 1939, just months before the outbreak of war, Sir Wilfred Freeman, one of the most senior figures in the RAF, argued that from March 1940 sales abroad "should take up the whole of Supermarine's output".

Part of the reason for this indifference towards the Spitfire was strategic. Before 1940, planners at the Air Ministry had not envisaged the kind of aerial combat between fighters that was to take place during Dunkirk and the Battle of Britain. They hadn't foreseen the rapid fall of France and so believed that the Luftwaffe would have to operate from bases within Germany. This in turn meant that the deadly Bf 109 fighter would not have the range to reach Britain. The Air Staff therefore perceived the main threat to be the German bomber force.

In the putative contest between RAF fighters and Luftwaffe bombers, manoeuvrability and rate of turn – two of the Spitfire's greatest assets – were seen as less important than firepower. And here both the Whirlwind and the Beaufighter, armed with cannon, appeared, in theory, to be more lethal than the Spitfire whose early versions carried less penetrative Browning machine guns.

Winston Churchill himself, though an eloquent advocate of a strong RAF throughout the 1930s, was guilty of this kind of flawed thinking. He too had little faith in the Spitfire before 1940, preferring to pin his hopes on two-seater fighters with rear-mounted turret guns. Typically, in 1938 he urged the Air Ministry to build "heavily armed" turret fighters "in as large numbers as we can". His request was driven by the fact that the forward-firing Spitfire had only one mode of attack and so in any pursuit was too easily exposed "to destruction". But there were other practical and political reasons for

the mounting disillusion with the Spitfire. In the four years after the maiden flight of the prototype in March 1936, the production of the plane was in a state of near permanent crisis, plagued by technical difficulties, gross mismanagement and recalcitrance in pockets of the workforce. Orders from the Air Ministry were not met; promises on deliveries were unfulfilled. Meetings of the Air Staff were filled with complaints about the alarming delays in equipping RAF squadrons with this new fighter. At one stage in 1938, the secretary of state for air, Viscount Swinton, described the shambles of the Spitfire programme as "a disgraceful state of affairs", while his military chiefs echoed this sentiment by attacking Supermarine's approach as "totally unacceptable".

Delivering promises

All this was a far cry from the excitement engendered by the Spitfire when it first took to the sky. With its phenomenal speed of 350mph, metal finish and sleek aerodynamic lines, the prototype appeared to be the harbinger of a new era for the RAF, then still largely equipped with fabric-covered biplanes capable of little more than 200mph. The plane was the work of Supermarine's chief designer, RJ Mitchell, whose genius combined engineering practicality with

creative flair. The Spitfire's maiden flight, on 5 March 1936, confirmed its awesome potential. "It really looked as if we were going to have something that could match up to anything the Germans could build," recalled RAF Intelligence Officer Group Captain Frederick Winterbotham.

Delighted with the success of the prototype, the Air Ministry had placed an order with Supermarine, part of the Vickers group, for 310 Spitfires. Sir Robert McLean of Vickers promised that deliveries would start in September 1937, reaching at least 60 aircraft by the end of that year. But, as the months passed, it became obvious that McLean's forecast was wildly optimistic. The schedule fell badly behind, and in January 1937, Chief of the Air Staff Sir Cyril Newall complained that Supermarine "had frankly miscalculated the magnitude of their task. The situation was most disquieting".

There were two factors at the heart of the production problems: one lay in the nature of the aircraft itself, the other in the running of Supermarine. The Spitfire was a far more advanced plane than any fighter previously built for the RAF, hence the techniques used in its manufacture were often highly complex, sometimes untested. An array of engineering difficulties were created by everything from the hydraulics for the retractable undercarriage to the curved leading edge of the elliptical wing, the Spitfire's most celebrated feature.

The other factor was logistical. In the mid-1930s, Supermarine was a small company with no experience of delivering a major contract. The firm had been established in 1913 in Southampton by the eccentric aeronautical pioneer, inventor and neo-fascist politician Noel Pemberton Billing, and for most of its existence had specialised in flying boats and seaplanes. When it won the contract for the Spitfire, it was short of facilities, space, equipment and staff. It was,

AT THE OUTBREAK OF WAR THE SPITFIRE WAS REGARDED WITH DISDAIN BY THE AIR MINISTRY AND SEEN AS A STOP-GAP

GETTY IMAGES

15 September 1940

The Battle of Britain reaches its most climactic day, with Spitfires playing a key role in turning back a massive Luftwaffe attack on London. The German high command mistakenly believes that the RAF is almost broken. In truth, Britain's fighter forces are stronger than earlier in the battle.

7 March 1942

Spitfires take off from HMS *Eagle* in the western Mediterranean to fly to Malta, where the strategically vital island is under siege. **They fight heroically against the superior Luftwaffe and Italian forces**, and with regular reinforcements arriving from aircraft carriers, begin to turn the tide. Their victory in the skies above Malta marks the beginning of the end for the Axis in the west.

May 1942

The Spitfire Mark IX is unveiled. With its two-stage, two-speed Merlin 61 supercharged engine, it is widely regarded as the greatest of all Spitfire marks. Squadron Leader Ron Rayner described it as "marvellous, absolutely incredible". Throughout the war, the Spitfire is in a constant state of evolution.

A Spitfire Mark IX comes in to land in September 1944

1 May 1951

The final combat flight of the Spitfire is undertaken by Wing Commander Wilfred Duncan Smith during the communist insurgency in Malaya. Spitfires assist with meteorological reports until 1957.



Taking to the skies Spitfire



Gunning for glory

A British propaganda poster, published c1942, depicts a Spitfire downing a Heinkel He 111 bomber. The aircraft would soon become a symbol of national pride

in the words of Denis Webb, a Supermarine manager, "a low-key set-up". To meet the new demands from the Air Ministry, the company not only had to expand its works and its payroll, but also sub-contract much of the Spitfire production. By 1938, almost 80 separate contractors were involved in the Spitfire order. These arrangements turned out to be a recipe for chaos, with the sub-contractors complaining about the late delivery of drawings and material, and Supermarine grumbling about the slow manufacture and poor quality of vital parts. The disarray was compounded by the building works at Supermarine. "The place reminded me of Dante's *Inferno*, except that in winter it was bloody cold with at times no roof and at other times no walls," wrote Webb in his private memoir.

A race against time

By May 1938, with still no Spitfires in service, the deepening shambles over the contract prompted a full-blown political crisis. Viscount Swinton, a tough Yorkshire squire, had been the driving force within government over the award of the Spitfire contract, but he now had to pay the price for the failure of Supermarine to deliver. The mood of panic at Westminster had been exacerbated by the increasing menace of highly militarised Nazi Germany, which had seized Austria in March and was threatening Czechoslovakia. As the row mounted and the Labour opposition pressed for answers on delays in the air programme, Prime Minister Neville Chamberlain forced Swinton out of the cabinet. Ironically, the first production Spitfire flew at Southampton on 14 May – the day of Swinton's departure – but it was too late to save him.

Swinton's replacement as air secretary was Sir Kingsley Wood, who immediately took a dramatic step that was aimed at transforming Spitfire production. He instructed the industrialist Lord Nuffield, founder of the Morris cars empire, to build a huge new factory to fulfil an initial contract for 1,000 Spitfires. Having promised to turn out 60 Spitfires a week once the £2 million factory was completed at its site of Castle Bromwich in Birmingham, Nuffield assured Wood that "no effort is being spared to make the ultimate issue a successful one".

Rarely has a pledge been left so unfulfilled. Lacking the dynamism of his youth, Nuffield proved a disastrous organiser of the project. He resented outside interference, moaned about the quality of drawings from Supermarine, complained about modifications to the Spitfire's design and failed to control the Castle Bromwich workforce or his expenditure, which shot up to £7 million



Midlands powerhouse

The Mark IIA assembly hall at Castle Bromwich Aircraft Factory, February 1941. The site was originally managed by Morris motor car magnate Lord Nuffield, before being handed over to Vickers

by March 1940 without a single plane coming off the assembly line.

It was obvious by then that Nuffield had lost his grip. When the bombastic press tycoon Lord Beaverbrook became minister for aircraft production in May 1940, on the creation of the Churchill government, he dismissed Nuffield and handed over management of Castle Bromwich to Vickers. A report commissioned by Beaverbrook showed how woeful the Nuffield regime had been. The study, written by aircraft manufacturer Sir Richard Fairey, painted "a picture of extravagance and an inability to understand the problems of aircraft production". Large sums of public money were wasted on machinery that was not used. Record-keeping was chaotic, management cowardly. The workforce was "in a very bad state. Discipline is lacking. Men are leaving before time and coming in late. There is every evidence of slackness," wrote Fairey.

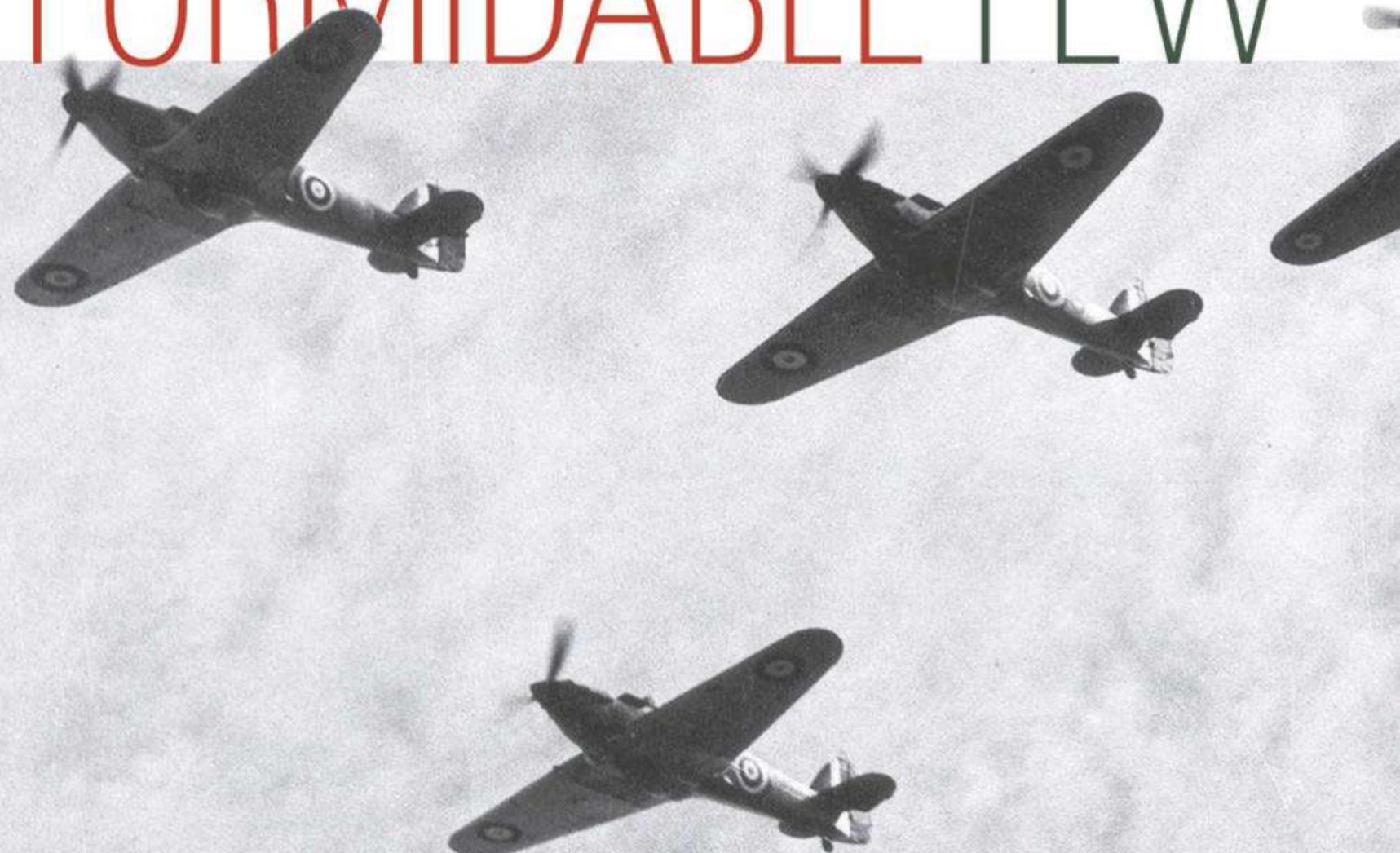
Castle Bromwich was soon turned around by Vickers, helped by a spate of sackings, and the factory produced 13,000 Spitfires during the war. But Nuffield's legacy, combined with Air Staff indifference and the earlier production problems at Supermarine, stretched Fighter Command to the limit in 1940. National survival would have been more assured had the Spitfire been available in greater numbers. As Sir Hugh Dowding, head of Fighter Command, put it after the war: "The main trouble was that we had such a tiny output of fighters".

Leo McKinstry is a journalist, historian and author. His books include *Spitfire: Portrait of a Legend* (Hodder & Stoughton, 2007)

LARGE SUMS OF PUBLIC MONEY WERE WASTED ON MACHINERY THAT WAS NOT USED... THE WORKFORCE WAS "IN A VERY BAD STATE"

The Battle of Britain has long been hailed as the triumph of the plucky underdog over the Nazi goliath. Yet, says **James Holland**, when rival fighters clashed over England in 1940, it was the RAF that held all the aces

THE FORMIDABLE FEW



At 4.30pm on 14 August 1940, 87 Squadron scrambled to their Hurricanes, quickly got airborne and started speeding towards Weymouth on the Dorset coast. "One hundred and twenty plus approaching Warmwell from the south," came the calm voice of the ground controller in the pilots' ears. "Good luck, chaps." Pilot Officer Roland 'Bee' Beamont swallowed hard and began to desperately scan the sky.

They were over Lyme Regis and flying at around 12,000ft when Beamont saw them, still out to sea – what looked to him like a gigantic swarm of bees all revolving around each other in a fantastical spiral from around 8,000 to 14,000ft. As the Hurricanes drew closer, Beamont could see that the swarm contained about 50 Stuka

dive bombers and two-engine Messerschmitt Bf 110s, along with single-engine Bf 109s directly above them. Although there were just 12 Hurricanes, the squadron commander shouted the attack signal, "Tally ho!", and they dove into the fray. In the brief, manic and confused melee that ensued, Beamont nearly hit a Stuka, before coming under fire himself. After shooting down two Bf 110s, he ran out of ammunition and headed for the safety of a cloud bank, emerging into the clear over Chesil Beach. He was hot, his uniform was dark with sweat, and he felt utterly exhausted. He was also astonished to discover that he'd only been airborne a mere 35 minutes.

Band of brothers

Beamont's experiences fit very neatly into the familiar narrative of the Battle of Britain, in which that small band of brothers in RAF Fighter Command repeatedly found themselves battling a vastly superior enemy over a sun-drenched southern England.

THERE WERE JUST 12 HURRICANES, BUT THE COMMANDER SHOUTED "TALLY HO!" AND THEY DOVE INTO THE FRAY

On that day, Beamont and his fellows in 87 Squadron were just 12 men taking on 120. Others regularly found themselves facing even greater odds – odds that have come to represent Britain's wider experience in the summer of 1940. It was a time when she was all alone, with her army defeated on the continent, her back to the wall – little Britain as David, defiantly fighting on against the

A force to be reckoned with

Hawker Hurricanes patrol the skies in 1940. Fighter Command's victory in the Battle of Britain reflected the immense power of the nation – one that could call on resources of which the Germans could only dream



Taking to the skies Battle of Britain



Action stations

RAF pilots scramble to their Hawker Hurricanes in 1940. Far from being hopelessly outgunned, Fighter Command could have put up 700 fighters at a time had it chosen to



Soft underbelly Luftwaffe bombers over England in August or September 1940. It may have appeared impressive, but German military might was built on shaky foundations

GETTY IMAGES

Goliath of Nazi Germany. Above all, Britain's finest hour was a triumph of backs-to-the-wall amateurism against the professional militarism of the Germans.

It is, however, a myth, and one that, 80 years on, we should put to bed once and for all. Britain was not alone, nor dependent on just a handful of young men in Spitfires and Hurricanes and the Captain Mainwaring figures of the Home Guard. Rather, Britain was one of the world's leading superpowers, and at the centre of the largest global trading network the world had ever known, with the kind of access to resources of which Germany could only dream. Britain had the world's largest navy, largest merchant fleet, access to around 85 per cent of the world's merchant shipping, and trading and business interests that went well beyond its empire. Within the Dominions and Commonwealth, there were also some 250 million men it could call upon to fight.

There was nothing amateurish about Britain's defence against potential German invasion. The conquest of France and the Low Countries had been fought on Germany's terms, but what followed was fought on Britain's. The Few, the pilots in their fighter aircraft, were one cog that made up the first fully coordinated air defence system in the world. This saw modern radar, an Observer Corps, radio and a highly efficient means of collating, filtering and disseminating this information being combined with a highly developed ground control to ensure that Luftwaffe raids such as those on 14 August were intercepted and harried repeatedly.

This defence system meant that Spitfires and Hurricanes would be in the air chipping away at the enemy and at the same time ensuring they were not being destroyed on the ground. Fighter Command could have put up more than 700 fighters at a time had they chosen to, but its commanders preferred different tactics – one of dispersal of forces and airfields more suited to a defensive battle. For a pilot like Beamont, however, it seemed as though just a few were taking on the many.

Moreover, Fighter Command was only one part of the RAF – both Coastal and Bomber Commands also played a full part in the battle. Bomber Command, especially, was repeatedly striking targets inside the Reich as well as Luftwaffe airfields in northern France. And the RAF was only one of three services. There was also the Royal Navy, Britain's 'Senior Service', and vastly superior to the Kriegsmarine, especially after the bloody nose it had inflicted on the German navy in Norway. And there was the army, admittedly rebuilding, but, by August, nearly 2 million-strong when including the

BRITAIN WAS NOT ALONE, NOR DEPENDENT ON JUST A HANDFUL OF YOUNG MEN IN SPITFIRES. IT WAS A LEADING SUPERPOWER

Home Guard, many of whom were far more proficient than *Dad's Army* would suggest. There were also significant coastal defences and chemical weapons ready to be deployed. Collectively, these were formidable defences.

In contrast, the German plans were disjointed, lacked any kind of combined services cooperation, and were supported by a transport lift that was frankly risible, and which was made to look even more so in light of future wartime amphibious operations. Fortunately for the Germans, they never had the chance to test their plans to cross the Channel. Rather, the Luftwaffe fell some way short of destroying RAF Fighter Command, the first line of Britain's defence, rather than the last as is usually portrayed.

So where does this view that Britain won the Battle of Britain by a whisker come from? In part it came down to public perception at the time. France had been defeated in just six weeks, the British Expeditionary Force had been forced into a humiliating retreat back across the Channel, and this had followed defeat on land in Norway. That Britain had won at sea off Norway counted for less in the public's eyes now that the swastika was fluttering over the continental coastline from the Arctic to the Spanish border.

Living in fear

In Britain there was mounting panic through May and June 1940 as it seemed the country would be next in the path of Nazi Germany's apparently unstoppable military machine. This widely held perception that Germany was a highly developed modern military behemoth appeared to be borne out not only by the prewar newsreels of rallies and grandstanding, but then by the speed with which they overran first Poland, then Denmark and Norway and then France and the Low Countries.

Few in Britain realised that only 16 divisions out of the 135 used in the attack in the west were mechanised, or that in Poland Germany almost ran out of ammunition,

or that the Reich was already suffering stringent rationing. Or indeed that there were never more than 14 U-boats in British waters and the Atlantic at any one time at any point since the war had begun. Most Britons had no idea just how shaky the foundations on which German military might was built.

The sense of German numerical and qualitative superiority was then further manifested in what British people were seeing with their own eyes once the battle got under way. A formation of 120 enemy aircraft would have looked awesome. However, as Bee Beamont had realised on 14 August, only around 40 of those were actually bombers, and it was bombers, primarily, that were expected to destroy the RAF by knocking out airfields, facilities and aircraft on the ground. The truth was that no matter how impressive such a formation may have looked in the summer of 1940, it was simply not enough.

Tom Neil was a pilot in 249 Squadron and, at the beginning of September, was operating from North Weald in Essex. On 3 September, Neil took off in his Hurricane along with 11 others and soon saw the airfield disappear under clouds of smoke as the Luftwaffe attacked. He wondered how they were ever going to land again, but an hour later they all did. "We just dodged the pot-holes," he later recalled.

This was something the Luftwaffe had not really considered. Destroying grass airfields of up to 100 acres required vast amounts of ordnance – ordnance the Germans simply did not have. Bomb craters were swiftly filled in, reserve operations rooms put into practice, and although many of Fighter Command's frontline airfields quickly looked a mess, only Manston, in the south-east tip of Kent, was knocked out for more than 24 hours in the whole battle. Just one.

Ten days after the Luftwaffe launched an all-out attack on the RAF (known as Eagle Day) on 13 August, the Stuka dive bombers, on which so many prewar hopes had been placed, were withdrawn. Losses were too great. There were not enough of the next-generation bomber, the Ju 88, which meant the lion's share of the bomber work was carried out by Dorniers and Heinkels – both increasingly obsolescent. By the beginning of September, thanks to the rate of attrition and low production, numbers of fighters were also diminishing. Most Luftwaffe fighter squadrons were operating at half-strength. Some had just two or three planes left; others were beginning the day with none at all.

Yet it was at this point that Air Chief Marshal Dowding, the commander-in-chief

WHERE THE GERMANS WENT WRONG

Ten reasons why the Luftwaffe didn't stand a chance of beating the RAF in 1940

POOR TACTICS

Although Luftwaffe commander-in-chief Hermann Göring had been a fighter pilot in the last war, he was a far better businessman than air commander. After 12 August, he halted further attacks on British radar stations, repeatedly made his subordinates come to him in Berlin, and disastrously began insisting his fighters escort the bombers closely, which meant losing their advantage of speed. Then he turned on London, which made no tactical sense.

INSUFFICIENT RADIO

The Germans had far more sophisticated radar than the British but failed to use it. Radio communications once in the air were non-existent between fighters and bombers, leading to repeated confusion. There were no ground controllers as such, so that once on their way to England, the Luftwaffe were left with the pre-flight orders and nothing more. Otherwise, they were on their own. Confusion frequently ensued.

HITLER'S SHORTCOMINGS

Because of his background and lack of military command experience, Hitler's geopolitical understanding was poor. He spent much of the summer of 1940 in a state of indecision, unsure what to do about Britain's refusal to play ball. He mostly remained in his Bavarian retreat, and there was no joint-service planning or joined-up thinking in any way.

POOR INTELLIGENCE

Luftwaffe intelligence was woeful and largely in the hands of Colonel 'Beppo' Schmid, who spoke no other languages, liked the bottle, and had barely been out of Germany. He was also a sycophant who told Göring what he wanted to hear rather than the reality. He massively underestimated British strength and had no idea that the RAF was divided into three commands.

THE WRONG FIGHTER

The Messerschmitt Bf 109E was the best fighter of 1940 as it could climb and dive faster, and pack a bigger punch and for longer than either the Hurricane or Spitfire. However, the twin-engine Bf 110, much loved by Göring, was cumbersome



Adolf Hitler discusses tactics with Admiral Erich Raeder at the Berghof, his Bavarian retreat, in July 1940

and ill-suited to air-to-air combat. A far better option would have been the Heinkel He 112, but this was discarded in favour of the Bf 110.

OVERDEPENDENCE ON DIVE BOMBING

The Luftwaffe high command were obsessed with dive bombing and placed the future of bomber development with this in mind. Dive bombing was fine when the Luftwaffe controlled air space and when attacking a fixed target, but as Dunkirk had shown, it wasn't so effective when targets such as ships were moving or when British fighters were waiting to pounce. Over England, the Stukas were decimated and swiftly withdrawn.

LACK OF HOME ADVANTAGE

If an RAF pilot was shot down, then provided he was uninjured, he could be flying again later that day. In contrast, if Luftwaffe aircrew came down over England, for them the war was over. British pilots were also treated like heroes whenever off-duty, whereas if a Luftwaffe pilot went to a French bar when off-duty, the chances were he'd be treated with cool contempt. Furthermore, Luftwaffe pilots had to cross the Channel to fight, and the fear of being lost and drowning increasingly played on their nerves.

INSUFFICIENT CARE OF PILOTS

One of the reasons Dowding was so worried about squadron strength dipping to 75 per cent was because he feared it would mean putting too much strain on his pilots. The Luftwaffe command had no such concerns, forcing their aircrew to fly and fly and keep flying. Unlike in Fighter Command, any kind of leave was rare and irregular. Combat fatigue was the result.

LOW AIRCRAFT PRODUCTION

Aircraft production lagged badly behind that of Britain. In July 1940, for example, Britain produced 496 new single-engine fighters, while the figure for the Luftwaffe was just 240. It was a ratio that only worsened as the battle progressed. Complacency, shortage of materials, and increasingly chaotic staff procurement were to blame.

NOT A STRATEGIC AIR FORCE

The Luftwaffe was designed to support the army, and was highly effective at this role during the war's early campaigns. As such, it was later called a tactical air force. Taking on the RAF, independently from ground forces, was a strategic rather than a tactical role – and one for which it had never trained.

of Fighter Command, and Air Vice Marshal Keith Park, commanding 11 Group in the south-east, feared they facing defeat. It was not for lack of aircraft: the new Ministry of Aircraft Production was building more than double that of Germany, while the Civilian Repair Units had increased numbers by a staggering 186 per cent. No, it was pilot shortage that so worried them, or specifically, trained pilot shortage.

Exhausted invaders

This was largely due to an overestimation of German strength. British intelligence was excellent, but it had been assumed that German *staffeln* were structured in the same way as British fighter squadrons – that is, with almost double the number of pilots to keep 12 in the air at any one time. For example, on 15 August, when Bee Beamont had been in action, Tom Neil had spent much of the day on the ground watching other members of the squadron taking off to meet the invaders. He finally flew later that afternoon, allowing those who had flown earlier a rest.

Park claimed that many of his squadrons were operating at 75 per cent strength – yet even then, he meant they were down to 16–18 pilots, not eight or nine. This was far more than the Germans could call on. On paper, Luftwaffe squadrons were 20-strong – not 24, as the British believed. In reality, the situation was even more critical – many had only nine aircraft at the start of the battle. Attrition and aircraft shortage reduced those numbers further after several weeks of fighting.

Neither Park nor Dowding had any idea about this gulf between perceived and actual strength. For the Luftwaffe, this meant fighter pilots were made to fly ever more sorties to make up the shortfall. Few British pilots would fly more than three times a day, and usually not more than twice. By September, their opposite numbers might fly as many as seven times. The physical and mental strain of this was immense.

In the traditional narrative, the crisis passed in the nick of time when the Luftwaffe changed tactics and began bombing London instead of airfields on Saturday 7 September. Since the attack on the airfields was failing, the change of tack, while making little tactical sense, was perhaps not as significant as the idea thought up by Park that very same day. He suggested introducing a system of squadron classification. 'A' squadrons would be in the front line and consist of experienced combat



Ready and waiting Airmen grab rest between missions at RAF Hawkinge in Kent, July 1940. Fighter Command's fears that it was about to run out of trained pilots would prove unfounded

WHILE FEW BRITISH PILOTS WOULD FLY MORE THAN THREE TIMES A DAY, THE ENEMY MIGHT FLY AS MANY AS SEVEN

pilots. 'C' squadrons would be filled mostly by men straight out of training but with a few old hands and would be placed away from the front line, such as in Acklington in Northumberland, where they could build up hours, learn the ropes and get some combat experience against the odd obliging German raider from Norway.

Category 'B' squadrons were in between the two. And pilots and squadrons could be moved around at a moment's notice. In a trice, Park had done much to solve the pilot crisis. Thereafter, Fighter Command never looked back. By the time the battle officially ended on 31 October, it was stronger than it had been at the start. The Luftwaffe, by contrast, never really recovered.

Was the Battle of Britain the country's finest hour? One of them, certainly, as it consigned Hitler to a long attritional war on multiple fronts – a conflict his forces were not designed to fight, and which materially meant they would always be struggling.

It was the victory that unquestionably turned the tide of the war, but was also a very well-fought, meticulously planned and managed battle that demonstrated many of Britain's undoubted strengths. Eighty years on, we should celebrate that brilliance as well as the courage of the Few.

Fearing the worst
An overestimation of German strength led Air Vice Marshal Keith Park to fret that Britain faced defeat



James Holland is a historian, author and broadcaster. His latest book is *Sicily '43: The First Assault on Fortress Europe* (Bantam Press, 2020)

THE FLYING HELL-RAISERS

Living in close proximity to the civilian population enabled the Battle of Britain pilots to be warriors by day and playboys by night. **Martin Francis** reveals how they drank, danced and fell in love

Putting on brave faces

Hurricane pilots of 32 Squadron smile for the camera at Hawkinge in Kent, July 1940.

At the height of the battle, flyers could undertake up to four sorties a day



One of the sub-plots of the all-star 1969 cinematic epic *The Battle of Britain* was the turbulent romantic relationship between Squadron Leader Colin Harvey (Christopher Plummer) and his wife, Maggie (Susannah York), a section officer in the Women's Auxiliary Air Force (WAAF). Critics were quick to condemn what they felt was an irrelevant distraction from the film's predominant emphasis on the battle for supremacy over the skies of southern England in the summer of 1940. For most reviewers, it was self-evident that the heroic young pilots of Fighter Command were simply too busy with fighting to have time for affairs of the heart.

Clearly RAF fighter pilots were intensely preoccupied with flying and fighting during the summer and early autumn of 1940. When the Luftwaffe's assault was at its most intense, some flyers flew several missions in a single day, repeatedly taking off and returning to base after intercepting German bomber formations. On some days, they were too tired to even return to their quarters, and they slept outside, by their parked aircraft. However, there were also surprisingly extensive opportunities for pilots to seek release and relaxation, or to satisfy personal and domestic obligations – even at the height of the battle.

In the summer of 1940 the British public was able to view the heroism of the RAF fighter boys in the skies, as they struggled to make sense of the fast and furious aerial dogfights above their heads. Yet they were also privy to the flyer when off-duty, drinking with his comrades in a Kentish country pub, attending a West End show, dancing in a London nightclub or dropping off his sweetheart outside a suburban London home, before speeding back to base in an open-topped sports car.

What all these activities had in common was that they reflected the RAF's proximity to, and interaction with, civilian society during the Second World War. The RAF fought most of its war from home, which allowed flyers regular access to social drinking, partying, mass entertainment and dating to an extent that was inconceivable for, say, a member of the Eighth Army serving in north Africa or a petty officer on a tour of duty in a naval destroyer.

One of the most popular off-duty pursuits of flyers was drinking. Few RAF diaries or memoirs are without reference to riotous evenings fuelled by alcohol, and many are candid about the regularity with which



Letting off steam

TOP A pilot signs his name on the tail of a downed German plane before claiming his free drink

ABOVE Four members of the RAF let their hair down by belting out a tune, September 1940

flyers became inebriated. Some squadrons adopted a local pub, for example the Red Lion at Whittlesford, the White Horse at Andover and the White Hart at Brasted.

Drunken evenings in the officers' mess often incorporated games that offered relief from the stress of flying and fostered camaraderie. At RAF Coltishall in Norfolk, Douglas Bader's squadron performed the 'muffin man', where a flyer had to turn, sing and

bend his knees, all the time balancing a pint of beer on his head. At RAF Tangmere in West Sussex there was 'mess rugger' and 'ceiling walking'. The latter involved officers lifting one of their number above their heads, the soles of his shoes dipped in paint so that he could create the illusion of someone having wandered across the mess ceiling.

Most flyers insisted that they drank merely to celebrate the fact that they were still alive, not to stimulate false ecstasy or drown depression. However, clearly some pilots found that drinking helped, even if temporarily, to obliterate the distressing memory of the day's combat they had just completed and the dread of what the next day might have in store.

Another artificial mood-enhancer that flyers had access to was benzedrine. RAF medical officers regularly distributed 'wakey wakey' pills to those suffering from fatigue, but pilots became skilled at obtaining additional supplies of the stimulant, which they then hoarded and used to sustain their energies during off-duty parties. Spitfire pilot Bob Holland was spied at a party in the officers' mess at RAF Hornchurch, Essex, gobbling down benzedrine, washed down with whisky, before flamboyantly belting out a tune on the upright piano.

Going out on the town

Many of the major Battle of Britain air bases were close to the perimeter of London, and pilots were able to spend off-duty hours in the bars, restaurants and nightclubs of the capital. Pilots at RAF Manston in Kent drove to the West End late at night and hung out in nightclubs such as Hatchetts in Piccadilly until two o'clock in the morning, before returning to base just before dawn.

Indeed the association of the fighter boys with the West End nightclub became one of the clichés of popular representations of flyers in 1940. The artist Cuthbert Orde, commissioned to paint a portrait of the wing commander Michael Robinson, characterised his sitter as one who was "to be found, when off-duty, mostly in nightclubs, and, when on duty, mostly in the air".

RAF flyers themselves were not entirely blameless for the popular association

**FLYERS HAD TO TURN,
SING AND BEND THEIR
KNEES, ALL THE TIME
BALANCING A PINT
GLASS FULL OF BEER
ON THEIR HEADS**

Taking to the skies Flying hell-raisers

High scorers

Personnel from 92 Squadron display their scoreboard recording how many enemy aircraft they had shot down



between the fighter boys and the pursuit of pleasure. Squadron Leader John 'Chips' Carpenter was one of a number of pilots who had the name of their favourite West End nightclub (in his case, Chez Nina) inscribed on the side of their aircraft.

The combination of extraordinary bravery and carefree hedonism with which RAF Fighter Command was associated in the summer of 1940 was encapsulated in 92 Squadron, based at Biggin Hill in Kent. The playboys of 92 – especially Tony Bartley, Bob Tuck and Brian Kingcome – took respite from undertaking up to four sorties a day at the height of the battle in a social scene that was both elaborate and extensive.

Biggin Hill's proximity to London ensured that these young flyers became a regular fixture in hotel bars, private parties and nightclubs. They travelled into the West End in a fleet of fast cars: Bartley owned a 12-cylinder Lincoln Zephyr coupe, Kingcome an SS 100 racer and Bob Holland a supercharged Bentley. All three cars were voracious consumers of fuel, which should have made them unusable at a time when petrol rationing was strictly enforced and most non-essential vehicles were garaged for the duration of the war.

The pilots of 92 Squadron, however, simply filled their cars with (potentially

RAF HELL-RAISING, WAS INDULGED, JUSTIFIED BY THE EXTRAORDINARY STRUGGLE FOR NATIONAL SURVIVAL

lethal) high-octane fuel from the aircraft petrol bowsers on their base. When police officers came to Biggin Hill to remonstrate with the adjutant about the unlicensed sports cars that RAF officers had been recklessly driving through the country lanes of Kent, they were plied with drinks so that they unintentionally divulged the date of the next audit of cars for licensing violations. Needless to say, on these days, any flyers travelling to London took the bus or train.

The men of 92 Squadron also organised fancy-dress parties and entertained celebrated singers and actors (notably Laurence Olivier and Vivien Leigh) in their mess. They even held dances in their hangars, to the

accompaniment of the base's own jazz band, composed of London nightclub musicians who had been deliberately conscripted as ground crew by Biggin Hill's music-loving personnel officer.

Of course, not all flyers were as relentless in their pursuit of pleasure as the pilots of Biggin Hill. For example, 74 Squadron never indulged in large cars, nightclubs and fancy dress, and its commanding officer, Adolph 'Sailor' Malan, deliberately kept his pilots clear of the playboys in 92 Squadron. When John Carpenter transferred from 263 to 222 Squadron, he was horrified to find that his new comrades were a "very sober crowd" who did not go and party like their equivalents in his previous posting. However, most pilots pursued their off-duty high-living with a gusto that was appropriate to their status as young men perched on the edge of oblivion, and most of their commanders indulged this need for release from constant fear and tension.

From hooligans to heroes

How did the public respond to fighter boy hedonism? In the 1930s polite opinion had been outraged by the youthful exuberance and apparent levity of the peacetime RAF. Kay Carroll, the wife of an RAF officer, recalled in 1941 that, before the war,



A hero's welcome Flight Lieutenant Eric Nicolson chatting with schoolchildren in North Yorkshire. He was awarded the Victoria Cross in 1940



Standing proud Officers from the Women's Auxiliary Air Force (WAAF), pictured in January 1940

civilians had refused to let their properties to flying personnel. Carroll and her husband had been repeatedly turned away by landladies, who appeared convinced that all air force officers were permanently drunk and that their wives were recruited exclusively from local pubs.

However, during the Battle of Britain, Carroll noted, RAF flyers were dramatically transformed into the 'pick of Britain's manhood'. Hooligans had, almost overnight, become heroes. In the summer of 1940, RAF hell-raising, far from being condemned, was indulged, justified by the extraordinary struggle for national survival in which these pilots were engaged. Indeed it became a critical part of the public image of the flyer: that of the fresh-faced young man living life to the full in the precious intermissions between active duty, a reckless sensualist under constant sentence of death.

Public infatuation with 'the Few' inevitably created opportunities for young flyers in the domains of love and sex. Some pilots, it is true, felt that the ever-present possibility of physical annihilation made romantic sensibility inappropriate. If a flyer could not protect himself from the cannon fire of a Bf 109, he could at least prevent himself being downed by Cupid's arrow.

Peter Townsend, who had a relationship

with Princess Margaret in the 1950s, recalled that fighter pilots were often troubled by the presence of lovesick flyers in their midst, fearing that, now they had someone else to care about, they were less likely to take risks for their comrades when in combat. Nevertheless, as young men, RAF flyers inevitably possessed a healthy libido. The disruptions of wartime led to a temporary loosening of the standards of prewar sexual morality, and judging from the accounts of young female bohemians such as Mary Wesley and Joan Wyndham, the fighter boys participated fully in this new climate of sexual freedom.

However, the flyer's interest in the opposite sex was rarely just about physical gratification. Women also offered emotional support for men whose strict masculine standards of restraint prevented them from breaking down in front of their male comrades. Pilots sometimes diverted their aircraft from their scheduled routes so that they could fly over the houses and hotels in which their girlfriends were accommodated.

Thanks to the physical proximity of WAAF personnel, romantic attachments often developed on the air bases themselves. The RAF hierarchy formally disapproved of airfield romances, especially if the relationship was between a male officer and a WAAF from the ranks. Yet this didn't prevent WAAFs with pilot beaux from following their missions over the intercom system in the control room at base or HQ.

Most of these relationships were ultimately brief, terminated by redeployment or even death. However, many led to the obligations of marriage and fatherhood. Indeed it is important to note that many of the most well-known fighter pilots of the Battle of Britain – among them Peter Townsend and Douglas Bader – were either already married in the summer of 1940 or wed shortly afterwards. Malan told Cuthbert Orde that having a wife and son was a "great moral help" to him, providing something tangible to fight for and defend.

While the fictional relationship of Colin and Maggie Harvey in *The Battle of Britain* might have been unconvincing and contrived, its referencing of the romantic and domestic distractions of the fighter boys was grounded in historical truth. If we are to gain a full understanding of what life was like for those who fought in the Battle of Britain we need to appreciate the story of the flyer in love and play, as well as the flyer at war. ■

Martin Francis is professor of war and history at the University of Sussex. His books include *The Flyer: British Culture and the Royal Air Force, 1939–45* (Oxford University Press, 2011)

BACK DOWN TO EARTH

As the summer waned, so did the hedonism

The reckless hedonism exhibited by off-duty fighter pilots in the summer and autumn of 1940 was, to some extent, a product of the particular intensity of the Battle of Britain. Once the worst of the crisis had passed and the air war adopted some semblance of routine, discipline and formality was inevitably restored.

Even 92 Squadron was not immune from this changing climate. In October 1940, an RAF psychologist was sent to Biggin Hill. After three days of observation, he concluded that the pilots' riotous leisure activities were having no obvious compromising effect on their military capability. However he also inferred that 92 Squadron's habit of burning the candle at both ends could not be sustained forever.

A tough Canadian, Johnny Kent, was dispatched to instil some discipline at Biggin Hill. He began with uniforms, adapting a policy of zero tolerance towards the penchant of 92's flyers for check shirts, suede shoes, red trousers and pyjamas worn under flying kit, and soon after that discouraged fast cars and scaled down the parties held at the manor house which served as the officers' mess.

The shift in the RAF's war, beginning in 1941, from fighter defence to bomber offensive had a definite impact on the service's leisure culture. Most bomber airfields were in remote parts of Lincolnshire, and they lacked the easy access to the pleasure zones of the metropolis that Battle of Britain bases had enjoyed.

The particularly intense hell-raising of the summer of 1940 was rarely repeated, although heavy drinking, high jinks and romantic relationships with WAAFs continued to characterise the off-duty world of a service that, throughout the war, retained a self-consciously youthful, relaxed and informal culture.

WHEN WOMEN FLEW SPITFIRES



Giles Whittell shares the stories of three intrepid women who flew the RAF's legendary fighter and helped blaze a trail for female pilots in Britain



A group of 'ATA-girls' pictured at a flying demonstration. The pioneering recruits ferried RAF aircraft throughout Britain

THEIR SUCCESS IN PERSUADING THE RAF THAT ITS AIRCRAFT WERE NOT THE PRESERVE OF MEN WAS ONE OF THE MORE CIVILISED UPHEAVALS OF THE WAR

A female reader of *Aeroplane* magazine labelled them "disgusting!". A "menace", declared the editor himself. They were writing, at the beginning of the Second World War, about women who wanted to fly combat aircraft – and it seems that the RAF's top brass shared their revulsion.

All were made to look out of touch soon enough, however. By January 1940 a select group of female pilots were being trained by civilian instructors to fly RAF Tiger Moths from factories to frontline bases in order to release male pilots for combat. By 1941, women were taking to the skies in Spitfires.

These were the 'ATA-girls', the heroines of the Air Transport Auxiliary. They never flew in combat, but they ferried aircraft throughout Britain until VE Day and beyond. Their success in persuading the RAF that its aircraft were not the preserve of men was one of the more civilised upheavals of the war, and it started, appropriately enough, over lunch.

On 16 December 1939, Pauline Gower, the daughter of a prominent Tory MP, invited 12 of England's most experienced women flyers to Whitchurch aerodrome, near Bristol, for a midday meal and a flight test. Gower was a woman of extraordinary energies. She had amassed 3,000 hours in the air, giving joyrides to holidaymakers, and had personally lobbied the Ministry of Civil Aviation at the outbreak of war to be allowed to recruit women to help ferry RAF planes.

Gower prevailed, and the Whitchurch lunch was the result. Over the next six years her 164 female recruits to the ATA flew 200 aircraft types in all weathers, with no instrument training. Fifteen were killed, but the survivors – three of whom are profiled on the following pages – would remember the experience as the defining adventure of their lives.

Taking to the skies Female pilots

Diana Barnato Walker, seen here in 1963, loved the media attention



SAVED BY A TABLECLOTH

Diana Barnato Walker, the granddaughter of a South African diamond millionaire, was the first woman to fly a Spitfire across the Channel, and the first British woman to break the sound barrier, flying an English Electric Lightning in 1963. Alone among the women of the ATA, she revelled in the attentions of the press. "I loved every minute of it," she later recalled.

It was in her father's country estate in Surrey that two friends, both pilots, coached her for the flight test that would admit her to what the *Express* called "the most glamorous war work women are doing".

But she could not live for work alone. Posted to the ATA's Number One ferry pool at White Waltham, Berkshire, she drove across to London most evenings to mingle with off-duty fighter pilots at the 400 Club on Leicester Square. She spent an evening there in January 1943 with Max Aitken, Lord Beaverbrook's son. When she explained that ATA ferry pilots flew with no wireless or instrument training, he was appalled.

"Max got out his fountain pen and, to my horror, drew an instrument panel on the pink linen tablecloth," Barnato Walker recounted some

63 years later. "He gave me a lesson there and then on what to do on instruments, and I needed it the next day or I wouldn't be here."

The following day, high over the Cotswolds in a Spitfire Mark IX, she encountered every pilot's nightmare – a sudden temperature inversion that turned a clear sky into solid condensation in seconds. Remembering her tutorial from Aitken, she turned immediately through 180 degrees, descended carefully through the murk and tumbled out of the cloud at treetop height to land on a waterlogged grass airstrip at what she later discovered to be RAF Windrush.

A month before D-Day she married Wing Commander Derek Walker, a decorated fighter ace. As a late honeymoon, they flew wingtip to wingtip in a pair of Spitfires to a newly liberated Brussels. They had permission from Air Marshal Sir Arthur Coningham, but not from London, and Walker was docked three months' pay as a result. Tragically, he crashed and died flying to a job interview five months after the end of the war.

Many decades later, Barnato Walker herself passed away at the ripe age of 90 in 2008.

LOST IN TRANSLATION

Margot Duhalde arrived in Britain with no command of English and no intention of flying for the ATA, but a series of misunderstandings changed all that.

The granddaughter of a French Basque immigrant, Duhalde was born on a farm in Chile in 1920. For her 16th birthday, while she was at boarding school in Santiago, her father paid for her first flying lesson. Just four years later she was steaming towards Liverpool, hoping to fly for Charles de Gaulle against the Luftwaffe.

When Duhalde made contact with the Free French in London, though, she soon realised they had been expecting a man – and that flying for them was out of the question. By chance, a French pilot who knew her from Chile heard she was in England and offered her an introduction to the ATA. She passed her flight test but soon after became badly lost over north London and crash-landed in a field.

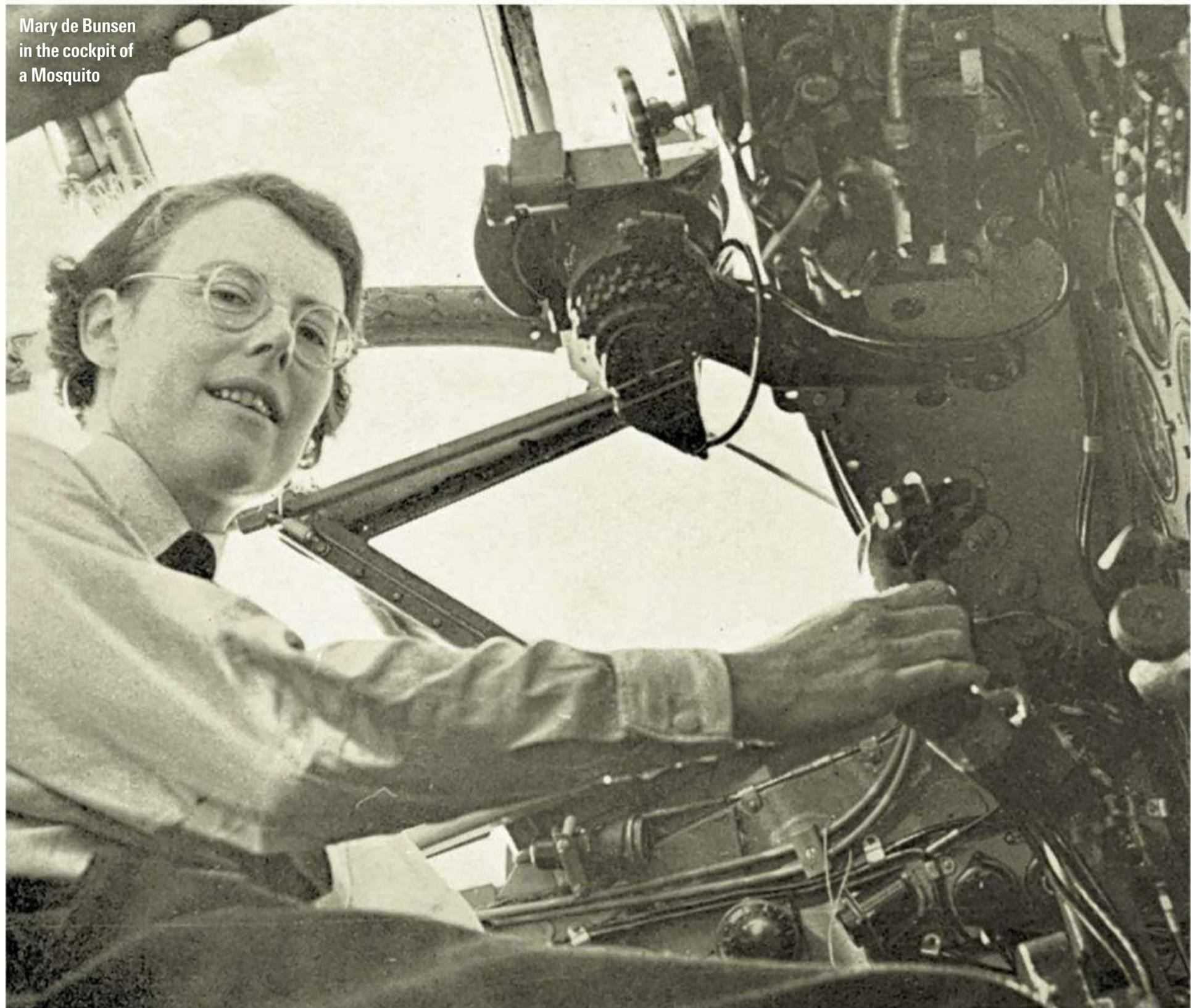
Pauline Gower, acutely sensitive to bad publicity, wanted to end Duhalde's ATA career there and then. But the young pilot had come too far to give up. She went to see the ATA's chief instructor in private, and he persuaded Gower to let Duhalde spend three months in the mechanics' sheds at White Waltham learning English before returning to flying. As she remembers: "I went into his office and cried like the Magdalena, and no one tried to stop me after that."

In fact others did try to slow her down, but without much success. While at the Hamble ferry pool, Duhalde fell out with a Polish pilot, Anna Leska, and was forced to apologise for cutting in front of her while taxiing for take-off and coming in to land. Duhalde was duly contrite before their commanding officer, "but outside, I told Leska that after the war I'd knock her teeth out".

In 1946 Duhalde realised her ambition of flying for the French. It was a short, non-combat assignment in Morocco, but enough to be awarded the Legion of Honour by President Jacques Chirac in 2006. From Britain, however, she received nothing more than her wartime wages and a certificate of service. Before her death in 2018, Duhalde was asked if that was enough. "I didn't come to be thanked," she replied. "I came to fly."

THEY HAD BEEN EXPECTING A MAN – AND SO FLYING FOR THEM WAS OUT OF THE QUESTION

Mary de Bunsen
in the cockpit of
a Mosquito



THE RELUCTANT DEBUTANTE

Mary de Bunsen was not a natural pilot; short-sighted, lame from polio and breathless from a weak heart. But she was not a natural debutante either, and flying was her escape route from “the ghastly fate of a daughter-in-waiting”.

Born in 1910, de Bunsen was the daughter of Sir Maurice de Bunsen, a former ambassador to Vienna. She so dreaded the balls she was expected to attend during the London season that she took up flying, even though her parents swore it would kill her.

She failed at her first attempt to join the ATA – “a bitter moment”, she wrote, since those who were accepted that day “had the dewy, sparkling look of souls reborn”. But eventually, in August 1941, she was accepted – thanks to a note in her licence from her oculist saying she could see adequately with glasses.

Posted to the Number 15 all-women’s ferry pool at Hamble, de Bunsen amused

her fellow pilots by buying a canvas-topped canoe and paddling across the Solent with her elderly mother towards the Southampton submarine barrage. She later explained: “Though apparently mad it was, of course, the perfect antidote to the tension of flying.”

Even so, that tension ultimately got the better of her. She developed an unfortunate habit of landing heavily in the Spitfires that the Hamble pilots were tasked with delivering daily from Southampton factories to nearby airfields for final testing and fitting-out. She bent several sets of landing gear and asked to be transferred to Scotland to avoid further embarrassment among the people she knew.

At the Kirkbride ferry pool (which she called “the saltmines”), she proved braver than most local pilots in the dangerous business of getting airborne in bad weather. But she was still terrified that a serious accident might see her drummed out of the

ATA and once spent eight straight days on the ground in Stratford, refusing to take off in her Hurricane until a plume of black smoke blowing south from the smokestacks of Wolverhampton dispersed.

After the war, de Bunsen flew to Philadelphia at huge personal expense for pioneering open heart surgery by a specialist who gave her a one in ten chance of survival. In fact, she lived until 1982, having retired to a former army hut at the foot of the South Downs to write, listen to music, and ruminate on war:

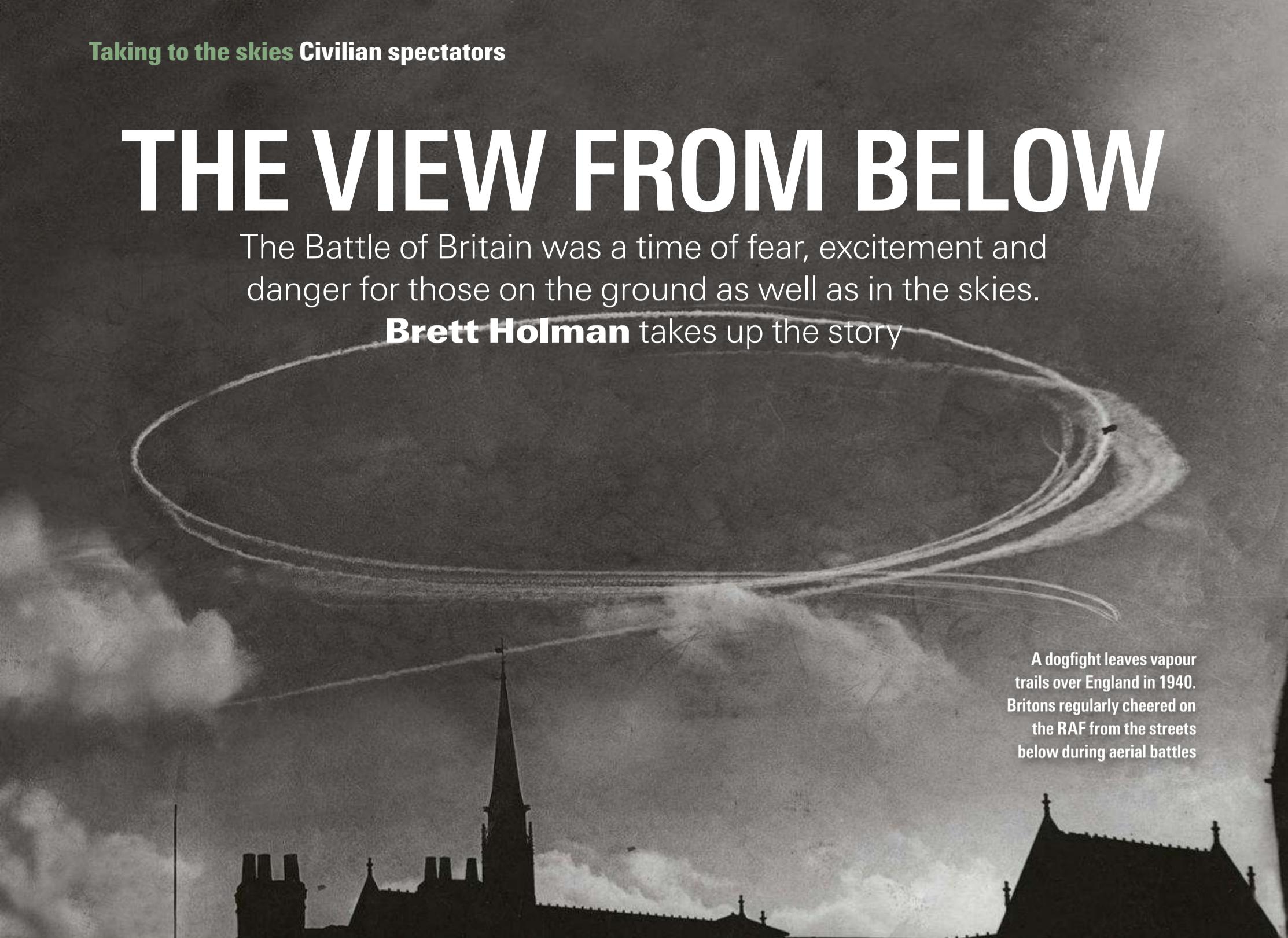
“I believe that fighting is a law of nature without which we rot,” she declared in an otherwise whimsical autobiography. “And I know that, under tyranny, worse things happen than death.” **H**

.....
Giles Whittell is an author and former *Times* correspondent. His books include *Spitfire Women of World War II* (HarperCollins, 2007)

THE VIEW FROM BELOW

The Battle of Britain was a time of fear, excitement and danger for those on the ground as well as in the skies.

Brett Holman takes up the story



A dogfight leaves vapour trails over England in 1940. Britons regularly cheered on the RAF from the streets below during aerial battles

Headlines from the *Daily Mail* on the morning of 16 September 1940 tell the story of what was later commemorated as Battle of Britain Day: "Million cheer London battle"; "Bomber wreckage rains on city"; "Crash at Victoria as crowd cheer".

They do not, of course, tell the whole story. But they convey a slightly different tale to the one we are most familiar with – the one that focuses on the exploits of 'the Few' or Hitler's grand strategy. The story told in these headlines is the one of what ordinary people witnessed, and what they thought (or hoped or feared) was going to happen next: the story of the battle from below.

Many people in the Home Counties could see the aerial duels unfolding over their heads – though often the only evidence of battle was the surreal and oddly beautiful tangle of vapour trails staining the sky. While they certainly cheered their fighter boys on, those on the ground could be curiously detached from the battle being fought on their behalf. It felt a lot like a game.

Newspapers updated their readers on the number of aircraft shot down by each side as

though they were cricket scores, and listeners were either excited or repulsed by live BBC broadcasts describing air combat in the manner of a sporting commentary. Despite scattered air raids on, or near urban areas over the summer, it wasn't until Croydon was bombed on 15 August that civilians began to realise that they were not just spectators but targets too. Even so, there was

little anger directed against German airmen themselves during the battle until after the start of the Blitz proper on 7 September (see page 46).

These terms – 'Battle of Britain' for the daylight air battles of July–October 1940, and 'the Blitz' for the night bombing of British cities from September 1940 to May 1941 – are actually somewhat artificial. Observers at the time did not recognise such neat distinctions, nor did they always use the same names. It is true that as early as 18 June Winston Churchill told the House of Commons that "the Battle of France is over. The Battle of Britain is about to begin." And the press did use the phrase, even in the sports pages. But people did not necessarily think of themselves as living through the 'Battle of Britain'.

A popular alternative was 'blitzkrieg'. This word had only entered the English lexicon after the German invasion of Poland in 1939. Today we understand it to refer to a lightning-fast ground offensive, amply supported by tanks and dive bombers. Blitzkriegs had overwhelmed France and the Low Countries in May and June 1940, and it was this that the British feared would next be

IT FELT LIKE A GAME. NEWSPAPERS REPORTED THE NUMBER OF AIRCRAFT SHOT DOWN BY EACH SIDE AS THOUGH THEY WERE CRICKET SCORES

A HOSTILE RECEPTION

How Britons greeted downed German pilots

turned on them. The *New Statesman* remarked in mid-August that it was too early to tell “whether the steadily increasing severity of the air attacks on this country marks the beginning of a blitzkrieg or is the opening stage of a long process of beleaguerment”. This makes it clear that the battle was thought to be the prelude to a German invasion, or the start of a state of siege by aerial bombardment.

A few weeks later, given the Luftwaffe’s heavy assault on London on 7 September, it seemed to be the former. *The Spectator* now speculated that the “full purpose of the blitzkrieg” was to break civilian morale:

“In such a scheme the intimidation of London would play a natural part, in the double hope that disorganisation might be created at the vital centre and forces be detached to defend the capital that should properly be deployed to repel aggression.”

This sounds very much like what had earlier happened to Warsaw and Rotterdam. And it helps to explain how the Blitz came to be so called, even though the steady, grinding rain of bombs on Britain’s cities through the winter of 1940 and the spring of 1941 hardly qualified as a lightning war. The projected invasion, the Battle of Britain and the Blitz were all seen to be part of the same master plan for the defeat of Germany’s last remaining enemy.

Expecting victory

Whatever they thought Hitler was trying to do, the British people generally had great confidence in the ability of their armed forces to defeat him, as the Ministry of Information’s analysts discovered. In mid-August, inhabitants of the East End were said to be making streamers for the anticipated victory celebrations. A month later, reports from Newcastle suggested people there were worried that Germany would not invade, the reason being that “any attempt is bound to be unsuccessful and would shorten the war”. Across Britain, rumours were rife that German troops had landed on the coast and had been repulsed – or even that they had not been repulsed – and that the news was being suppressed by the authorities for fear of causing panic.

The public had reason to believe that they were not being told the whole truth, especially when it came to bad news. For example, inhabitants of areas that had been bombed could compare their own experiences with the very limited information given out by the media. Rumour inevitably filled this perceived gap. Stories circulated that bomb damage was much greater than was being reported and that authorities had set up ‘super-mortuaries’ capable of

accommodating 50,000 air raid victims a week. These fears echoed the prewar belief that “the bomber would always get through” and would devastate London and other cities. That they seem to contradict the belief of most people in Britain’s ultimate victory perhaps suggests the strength of their determination and endurance.

Civilians found much to criticise in their government’s conduct of the battle. There were many calls for reprisal attacks against German cities, increasing in volume after 7 September. But until then the public’s anger was mostly reserved for inadequate air raid precautions. Controversy over raid alarms being sounded too early, too late or not at all persisted for months, as did confusion over the meaning of the signals themselves: some weary householders slept through the alert and only roused themselves to seek shelter when the all clear was sounded. At least one Manchester housing estate went on a rent strike in September over the lack of safe refuges, and communists led a noisy campaign for deep shelters carved out of the bedrock. And conditions in the big public shelters and in the London underground stations – at first occupied against government directions – were woefully primitive and unsanitary.

By early October, it was clear to most people that the worsening weather was making a landing by sea extremely risky. What’s more, the RAF was still flying. The government was at last responding to public pressure by improving shelters, particularly by announcing that a million bunk beds were to be installed and new shelters built.

So Hitler’s designs had been defeated. It was now a question of enduring the Blitz through the cold winter ahead, and perhaps for years after that. As *The Manchester Guardian* affirmed at the end of September:

“London has now had three weeks of serious bombing. From the bombardment of London the Germans hoped to produce widespread panic, to divert soldiers from the coastal defences, to destroy supplies, disturb production, and dislocate the national life. These aims, if secured, would have made invasion much easier. They have not been secured, nor will they be. There is no reason to suppose that, battered and damaged though she may be, London will be any less firm in spirit six or 12 months hence, provided we adapt ourselves deliberately and ruthlessly to new defensive ways of living.”

The many owed much to the Few, but the debt didn’t only run one way. **H**

Brett Holman is a historian and the author of *The Next War in the Air: Britain’s Fear of the Bomber, 1908–1941* (Routledge, 2017)

Luftwaffe personnel who were shot down over Britain were usually rounded up by the police, the Home Guard, or the army, but sometimes their first encounters were with civilians. In early August 1940, for example, Lady Buckland and her chauffeur were driving near Bristol when they were stopped by a dishevelled man. He turned out to be a German airman who had been hiding in the woods for nine days. He had not given himself up for fear that he would be executed on the spot. The lady and her servant drove the man to the nearest police station.

But on at least one occasion a downed German airman received a much more hostile reception. On 15 September, Oberleutnant Robert Zehbe, the 27-year-old pilot of a Dornier which was shot down over London, parachuted into Kennington. In his diary, journalist Basil Woon gave an account of what happened next:

“When he reached the street he found a crowd of angry women, who had been shopping from barrows nearby, waiting for him. They rushed forward, carrying sticks, stones and even fruit from the stalls... What would have happened to him if two stalwart police constables had not reached him first will never be known, but some of the women in that crowd had lost their homes, husbands, brothers, parents, by bombs.”

Zehbe died of his injuries the next day, and he now lies buried in Brookwood Military Cemetery. It has been claimed that he was in fact lynched by the mob. Yet there is no doubt that he had already sustained serious injuries when his bomber was attacked, and his wounds were probably already mortal.

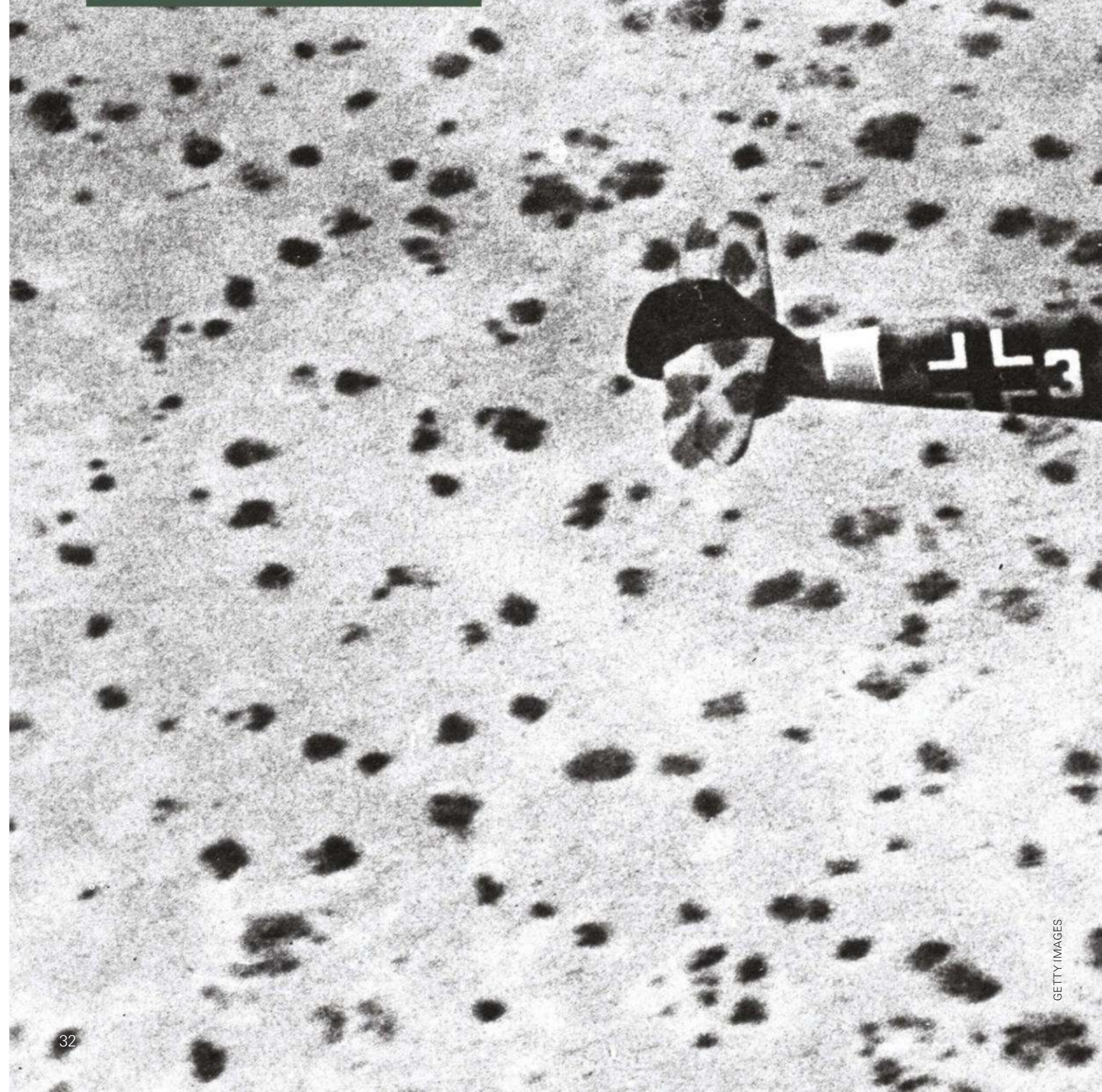
The Kennington incident nevertheless shows us how the Blitz intensified the participation of civilians in the battle, both physically and emotionally.

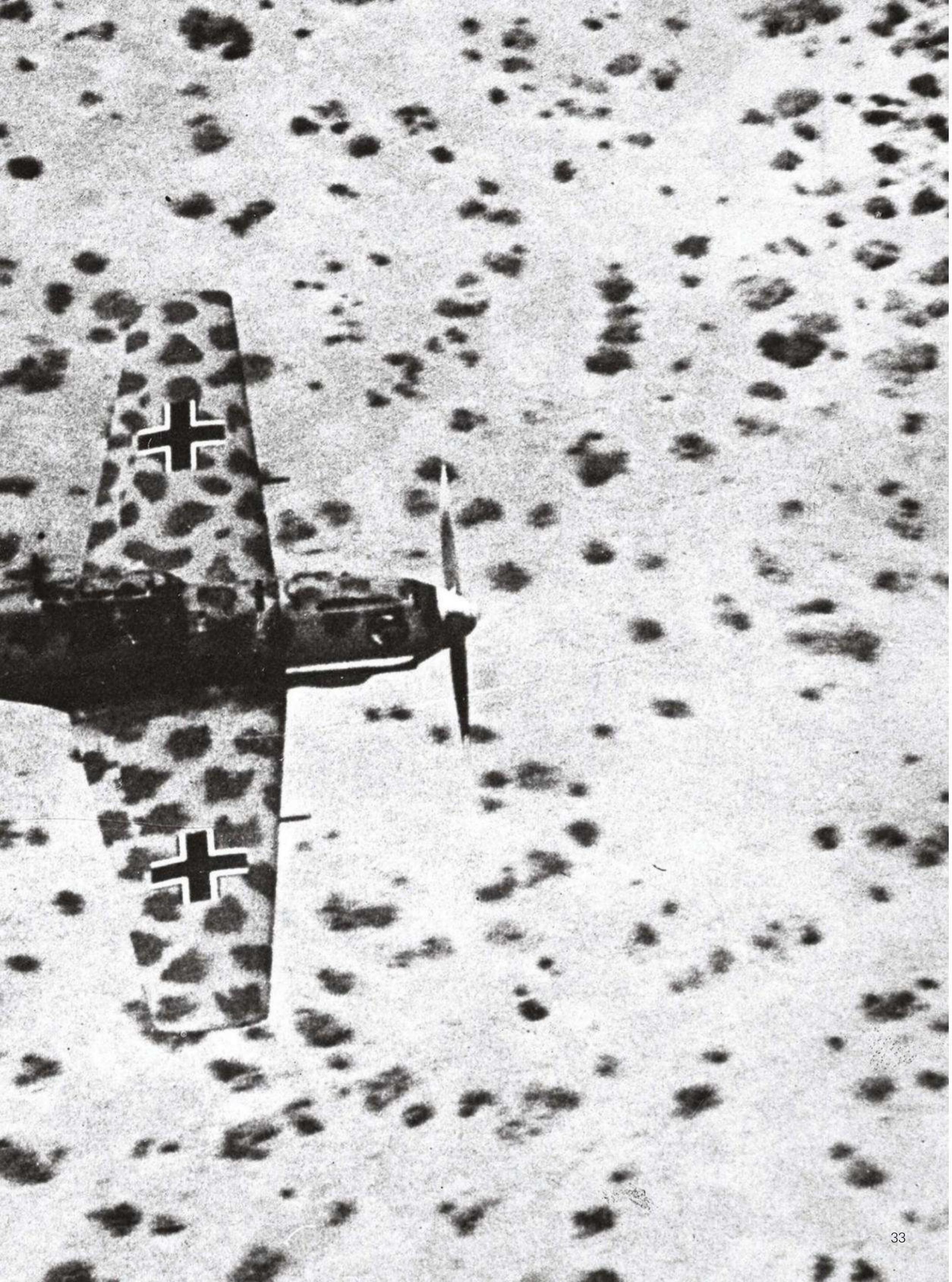


EYE OPENER

Out of sight

A camouflaged Messerschmitt Bf 109 passes over the Libyan desert during the summer of 1941. Luftwaffe units had first been deployed to Libya earlier that year, when they provided air support for General Rommel's Afrika Korps. Tasked with helping Italy retake territory it had lost to Britain, Rommel's men – assisted by pilots maintaining air superiority – besieged Tobruk and later pushed the rest of the British and Commonwealth forces back into Egypt.





Taking to the skies Luftwaffe



1 Up and away A hot air balloon being inflated in Paris during the Franco-Prussian War. Similar balloons were used by precursors to the Luftwaffe

2 Deadly dogfight A likely staged shot of a German two-seater Rumpler engaging in combat with British aircraft during the First World War

3 Covert operation In c1927, men straighten a crashed Fokker D XIII at Lipetsk, Russia, where Germany trained fighter pilots in secret

4 Revenge in mind Adolf Hitler, Hermann Göring and other Nazi officials pay their respects at a First World War memorial event, 1933



5 Lethal machines An assembly line of Messerschmitt Bf 109 fighter planes in Regensburg, 1940

6 Flames and fury Fuel depots along the river Thames burn after a German attack in September 1940

7 Packing a punch A rocket-powered Messerschmitt Me 163 B 'Komet' on an airfield in 1944

8 Out of the ashes Local residents in Dresden queue for a streetcar in 1945, surrounded by the rubble from Allied bombing raids

9 Time to fill up A Heinkel He 111 being refuelled on the eastern front in February 1943



3



4



THE MAKING AND BREAKING OF THE LUFTWAFFE

Feared, reviled and revered, few military organisations have carried a reputation quite like the Luftwaffe did during the Second World War.

Victoria Taylor reveals how the Nazis shaped this formidable air force – and the reckless mistakes that underpinned its demise

8



9



We were proud. We were pampered. We were the guarantors of the future.” Writing about his experiences many years later, the words of German flying ace Johannes Steinhoff reflect the innate confidence of the Luftwaffe during the early days of the Third Reich. Enraged by Germany’s humiliation at the Treaty of Versailles in 1919, it was both a burning sense of ambition and entitlement that fuelled the Luftwaffe’s destiny in becoming one of the most formidable air forces the world has ever seen.

Spearheaded by its forceful commander-in-chief, Hermann Göring, the Luftwaffe’s rise to notoriety under the Nazis appeared to corroborate their claim that Göring had built the air force “*als einzelner Mann*” (“as a lone man”). But in reality, the Luftwaffe had been created long before pilots such as Steinhoff took to the skies, initially as a secret *Schwarze Luftwaffe* (Shadow Luftwaffe) by the preceding Weimar Republic. As Heinrich Brüning, chancellor of Germany between 1930 and 1932, later claimed, “Hitler didn’t start the Luftwaffe – we did”.

To separate historical fact from myth, then, it is necessary to examine how the opportunistic Nazi regime made the air force its own – both to the eventual detriment of the world and, ultimately, to itself.

Bold beginnings

Germany first began to recognise the potential of aerial warfare during the 19th century. After Prussian forces witnessed France’s use of observational and evacuation balloons during the Franco-Prussian War (1870–71), the newly unified German empire formed its own stationary observational balloon units. Before long, balloons were being adapted so that they could scout across long distances, transport vital equipment and drop bombs on enemy territory.

By the 1910s, military aircraft had been incorporated into the *Deutsches Heer* (Imperial German Army), and in 1914, *Die Fliegertruppen des deutschen Kaiserreiches* (the Imperial German Army Air Service) entered the First World War. Later reshaped into the *Deutsche Luftstreitkräfte* (German Air Force) in October 1916, it provided the army with both aerial reconnaissance and ground and air support.

Despite the strain and dangers of the dogfights, pilots often came away with more favourable memories of warfare than troops stuck in the trenches, and the image of the valiant German airman became embedded in the national psyche. Indeed, in his



Flying for glory Germany’s *Jagdgeschwader* (fighter wing) 1 pictured c1917. The unit was dubbed the ‘Flying Circus’ due to its colourful aircraft and habit of setting up portable hangars resembling large tents

interwar biography of the Bavarian fighter ace Max Ritter von Müller, Hans Haller enthusiastically wrote of how “there was again man and courage; there was hunting and the landing of blows”. It was this chivalric aura that would soon give rise to other hallowed fighter aces such as Manfred von Richthofen (the famous ‘Red Baron’), as well as the likes of Oswald Boelcke, Max Immelmann and Werner Voss.

Nevertheless, with the influx of American airpower towards the end of the First World War, the odds simply became insurmountable for the *Luftstreitkräfte*. After Germany’s defeat in November 1918, the subsequent Treaty of Versailles banned the nation from possessing “any military or naval air forces”, evoking, in the words of one author, “a cry of rage through German aviation circles”.

Included among such circles was Hermann Göring – the unlikely last commander of Richthofen’s ‘Flying Circus’ fighter wing – who declared in his diary that he wanted to “restore German aviation to the world”. Cloaked with all the swagger and star power of a fighter ace, he piqued the attention of an Austrian corporal with similar aspirations of restoring Germany’s prewar ‘greatness’: Adolf Hitler. The two Nazis were eventually inserted into Germany’s government in 1933. In January, Hitler was made chancellor, and the next month, Göring was appointed Reich commissioner of aviation.

DESPITE THE STRAIN AND DANGERS OF THE DOGFIGHTS, PILOTS OFTEN CAME AWAY WITH MORE FAVOURABLE MEMORIES OF WAR THAN TROOPS STUCK IN THE TRENCHES



The ace of aces

Manfred von Richthofen (right) talks with fellow flying officers. Before his death in combat in 1918, the 'Red Baron' had chalked up at least 80 aerial victories

Taking to the skies Luftwaffe

Death from above Stuka dive bombers fly in formation over France in May 1940. Known for its distinctive shrieking sound, the aircraft played a key role in German blitzkrieg tactics



Bombs ahead German grenadiers watch an aerial attack during the Balkans campaign, 1941. The German and Italian air forces helped the Axis push their way through Greece and Yugoslavia



GETTY IMAGES

Yet according to the former Luftwaffe anti-aircraft assistant Georg Cordts, it was only in March 1933 that Göring truly came to realise the extent of the “treasures that had fallen into his lap”.

Secretly established the previous summer by the former Reich minister of defence, Kurt von Schleicher, Germany’s so-called Shadow Luftwaffe was intended to boast 630 officers and 4,000 other ranks by the end of 1936. This, in turn, built upon foundations that had been laid a decade earlier, when a covert military flight school was set up in the Russian city of Lipetsk. The convenient arrangement not only allowed the Soviets to obtain vital German expertise in fighter tactics and aeronautical development, but also enabled the Germans to circumvent Versailles’ restrictions on military flight in Germany.

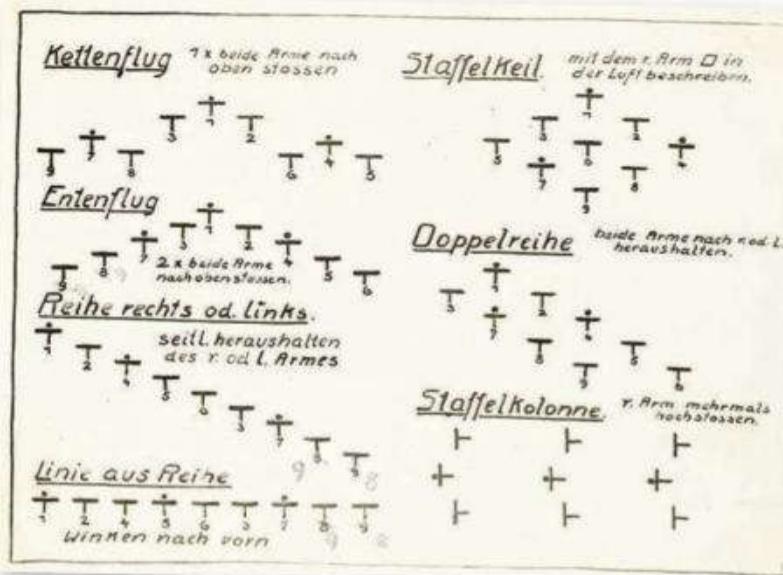
Between 1926 and 1933, around 120 German fighter pilots and 450 flying personnel attended the institution, where they used high explosives, engaged in live-fire practice and undertook mock dive bombing and fighter-bomber operations. Progress in boosting the number of potential pilots who could serve in the Luftwaffe had also been made by the Reich Transport Ministry, whose earlier recruitment efforts had seen the number of student commercial and civil pilots being trained double between December 1924 and March 1926.

Ushering in a new age

Keen to capitalise on the gains made by their predecessors, the Nazi regime urgently accelerated the Luftwaffe’s rearmament, pledging around 10.5 billion Reichsmarks for the purpose in 1934. And, with the passing of the *Wehrgesetz* (Defence Law) on 21 May 1935, the Luftwaffe was officially established as a branch of the German Wehrmacht (armed forces) alongside the Heer (army) and Kriegsmarine (navy) – all in direct contravention of the terms that had been set out at Versailles.

The Nazi Luftwaffe prided itself on its high operational standards, with only 5 per cent of applicants passing the rigorous entrance exam required to reach the interview stage for non-commissioned officer and officer ranks. Although the *Jagdflieger* (fighter pilots) and *Kampfflieger* (bomber crews) are two of the most well-known branches of the Luftwaffe today, by July 1944 there were 70 different career pathways within the air force, with the Nazis quick to praise the “flyers who don’t fly” at every opportunity.

Those serving as aircraft engineers,



Classified document A chart of flying formations used to help train students at the secret German fighter pilot school in Lipetsk, Russia, which was set up in cooperation with the Soviet authorities

mechanics, electricians, metal workers, carpenters and painters were all seen as being of particular value, as – in the words of the propagandists – “a fast, reliable and smoothly functioning ground service is the prerequisite for the operational readiness and fighting power of the ‘weapon in the air’”.

In terms of military strategy, the Nazis initially believed the Luftwaffe should be a *Risiko* or ‘risk’ Luftwaffe, using its fearsome persona as a deterrent to fulfil Nazi ambitions of quickly seizing territory without provoking war. Although some airpower theorists favoured the installation of a heavy strategic bombing element within the air force, the Luftwaffe’s successful intervention during the Spanish Civil War (1936–39) – from pulling off logistical triumphs for Franco’s Nationalists, to flushing out Republican strongholds – had been a temporary distraction from adopting a heavyweight approach.

But these early achievements shrouded many of the Luftwaffe’s shortcomings. By 1939, a shortage of manpower hovered over German aircraft production, and the Luftwaffe lacked a sophisticated ground-to-air communications system and integrated radar network. With Göring boasting that “no enemy bomber can reach the Ruhr!” (referring to the heavily industrialised region of western Germany), fervent Nazi rhetoric was also instilling a complacency within the Luftwaffe that would leave the Reich woefully underprotected.

Highs and lows

When news broke that Germany had advanced into Poland on 1 September 1939, an airfield construction manager near Hamburg noted that both “the youngest officers of the airborne units and old medal-decorated First World War officers sat around me with serious faces”. As Hitler’s bloodlust swelled, and as Göring’s eagerness to unleash ‘the Führer’s Hammer’ increased, the Luftwaffe quickly found itself embroiled in conflicts across the globe.

The Luftwaffe was intrinsic to the early success of the tactical phenomenon of blitzkrieg (lightning war), which was wielded to great effect in 1939 across Poland, before hitting Norway, Denmark, the Low Countries and France the following spring. Combining swift manoeuvres from highly mobilised armoured divisions with disorientating Luftwaffe air support, blitzkrieg was essential for the quick war Hitler desired and required. By June 1940, as the Allied forces retreated from Dunkirk, the Luftwaffe stood

BY JUNE 1940, AS THE ALLIED FORCES RETREATED FROM DUNKIRK, THE LUFTWAFFE STOOD IN AWE AT ITS OWN ACCOMPLISHMENTS

FIVE PLANES THAT DEFINED THE LUFTWAFFE

From jet fighters to dive bombers, these aircraft helped heighten the Luftwaffe's fearsome reputation in the skies

1 MESSERSCHMITT BF 109

Fitted with a liquid-cooled 1,020hp Daimler-Benz DB 601A engine, the Bf 109's guts were stuffed with all the modernised apparatus of the best fighter aircraft in the mid-1930s: a retractable undercarriage, trailing edge flaps, and an enclosed cockpit. It packed a concentrated punch of ammunition, armed with various combinations of 7.9mm MG 17 machine guns and 20mm MG FF autocannons, though MG 151 autocannons were later experimented with.

The Bf 109E took the fight to the RAF's Hawker Hurricanes and Supermarine Spitfires in the Battle of Britain. Unlike its British counterparts, whose Rolls Royce Merlin engines' float chambers were prone to flooding with fuel under negative G, the Bf 109's fuel-injected engine reduced its chances of stalling and kept it in the fight for longer.

2 FOCKE WULF FW 190

The arrival of the Focke Wulf Fw 190 in 1941 caused huge concern for the RAF's Fighter Command, who were puzzled by the sudden appearance of this stubby-nosed aircraft. Fitted with a 1,700hp BMW 801-D2 radial engine, later variants of the Fw 190 could fly up to 440mph at 37,000ft, with a ceiling height of 39,370ft.

Although it initially struggled with a few teething problems, the Fw 190 was designed with simplicity in mind: its parts were easy to manufacture and replace. It was often considered to be sturdier, more forgiving to less experienced pilots, and a better all-rounder than the Bf 109.

3 MESSERSCHMITT ME 262

The world's first operational jet fighter had its full potential curtailed by numerous delays in its development. The Luftwaffe and Adolf Hitler were notably divided over its role, with the führer envisioning it as a 'Jabo' (fighter-bomber) instead of a fighter interceptor.

Powered by a pair of BMW-003 turbojets, each with 5.40kN thrust, from November 1941, its developers

attempted to replace these with the temperamental 8.24kN Junkers Jumo-004 engines. Botched landings were common due to the plane's long nose, which could obscure the pilot's visibility on the ground.

Nevertheless, its advanced aerodynamics enabled it to reach an eye-watering top speed of 540mph. The Me 262's ultimate success lay in catalysing the rise of the jet engine.

4 JUNKERS JU 87 'STUKA'

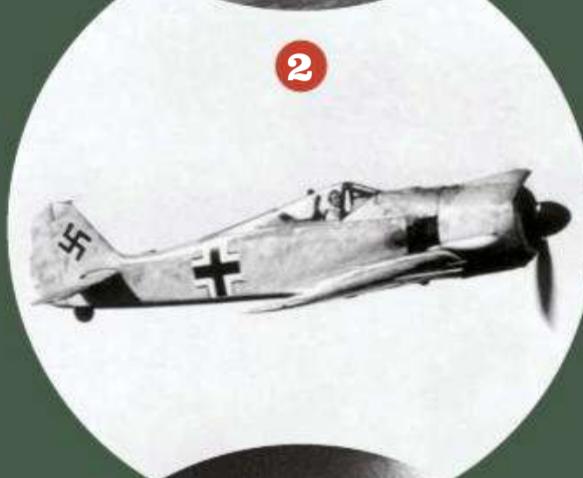
The two-crew Sturzkampfflugzeug ('Stuka') dive bomber entered service with the Luftwaffe in 1937, powered by a 1,400hp Jumo 211J-1 inverted-V piston engine from 1940. With a top speed of 230mph, which climbed to over 300mph in a dive, this gull-winged harbinger of death enjoyed great precision bombing success in the Spanish Civil War and during the first year of the Second World War.

But its vulnerability to attack due to its light armament rendered it increasingly obsolete. It is best known for its ear-piercing shriek while in a dive – produced by the wind whistling through the 'Jericho's Trumpet' siren fixed under its wings – which was designed to inflict psychological terror on the enemy.

5 HEINKEL HE 111

The mainstay of Germany's bomber offensive in the Second World War, the Heinkel He 111 medium bomber was powered by 1,200hp Junkers Jumo 211D 12-cylinder, inverted-V, liquid-cooled engines. This five-crew bomber had a top speed of 270mph and a maximum range of 1,280 miles. It was involved in some of the deadliest bombing raids in history – from Guernica and Warsaw, to Rotterdam and Coventry.

Its age was already beginning to show at the start of the Second World War, however: it was slow, lumbering, and unable to develop significantly beyond its 1934 specifications. Nevertheless, it remained sturdy and dependable – faithfully serving its Luftwaffe masters across all major German fronts until the end of the Second World War.



in awe at its accomplishments. "I am proud today that I was able to take part in the greatest battle the world has ever seen," wrote a breathless Luftwaffe anti-aircraft gunner.

Filled with confidence, the Nazi leadership turned its attentions across the Channel to Britain, but Winston Churchill had no intention of accepting Hitler's request to sue for peace. Dismayed at his refusal to surrender, the *führer* ordered the Wehrmacht to prepare for an amphibious invasion of Britain – code-named Operation Sea Lion – on 16 July. The Luftwaffe's fighter pilots and bomber crews sought to soften up the country for invasion with a relentless aerial campaign.

Although the Luftwaffe ran the RAF ragged during the resultant Battle of Britain – attacking Allied shipping, British ports, airfields, radar installations and aircraft factories – it did not achieve the level of air superiority necessary to make Operation Sea Lion viable. Nor was Britain's defeat secured by the Luftwaffe's switch to bombing its cities during the Blitz from early September 1940 until May 1941.

Disappointed, Hitler diverted his attention towards the Luftwaffe's other deployments. In particular, the air force was becoming more committed to the North African campaign – fighting over Libya, Egypt, Morocco and Tunisia. The Luftwaffe also enjoyed a stunning yet demanding performance over the Balkans from April 1941, after its fellow Axis power, Italy, had invaded Greece the previous October.

A fatal misstep

Hitler's chief priority, though, was to capture more *Lebensraum* or 'living space' by invading the Soviet Union. The Luftwaffe was partially redirected from the Blitz over Britain to the eastern front for Operation Barbarossa in June 1941. However, the ensuing invasion proved a step too far, and the Wehrmacht became locked in a bloody struggle with the Soviets that drained German resources even further – overstretching the heavily deployed Luftwaffe.

Matters were made even worse for the Nazis when the Allied strategic bombing offensive started to cause chaos back at home in Germany. In January 1943, Churchill and US president Franklin D Roosevelt had promised Soviet leader Josef Stalin they would ramp up their existing bombing campaigns to further split their foe into an exhausting "war on two fronts".

Although the Luftwaffe still managed to inflict heavy losses upon the Allies on



Imperfect partners Hermann Göring with Adolf Hitler in 1944. Their blunders helped hasten the Luftwaffe's disintegration, argues Victoria Taylor

occasion, the ruthless British-American firestorm that rained down on Hamburg in July 1943, and the controversial raids on Dresden between 13–15 February 1945, left German airmen feeling especially deflated. "The three consecutive attacks in 12 hours left every aid organisation smashed and resulted in destruction unlike anything else," said one member of the Luftwaffe after visiting Dresden on 18 February 1945. "[The city] is no more."

But in truth, morale had been cracking since 1944. Temperamental and experimental aircraft – such as the rocket-powered Messerschmitt Me 163 'Komet', the Heinkel He 162 Volksjäger and the Arado Ar 234 – were hastily constructed to little effect. Frustrated by Germany's decline, Hubert Retz, a Luftwaffe radio operator, declared in a letter to his fiancée in May 1944 that "it will soon be time for this circus to come to an end, otherwise there will be no city in the whole of Germany that has not been destroyed".

Overall, the Luftwaffe's disintegration was hastened owing to a catalogue of blunders by both its operational leadership and political guardians. Its overcommitment at the hands of the rapacious Nazis strained the air force until fuel shortages, a slump in aircraft production, insufficient pilot training and inadequate logistical support all crippled the Luftwaffe from within.

Such was the desperation in the Third Reich that, towards the end of the war, the Nazi regime even suggested the formation of a dedicated *Hitlerjugend* (Hitler Youth) squadron – to the utter horror of the Luftwaffe. Before this madcap scheme could be executed, however, the Nazis capitulated on 7 May 1945, and German aviation was set right back where it had been in 1918: defeated, disarmed, and effectively deceased.

A scathing Luftwaffe report from January 1945 perhaps captured the true reasons for the air force's undoing when it claimed that the Nazi regime had "attached too little value to education" and "wanted too much to do with morality and the representation of dogmas [than] to be achieving the goal of a higher performance".

The Luftwaffe had been crushed under the leadership that had once helped it to fly – and the price for its wartime glory would be peacetime infamy. ■

Victoria Taylor is an aviation historian based at Hull and Sheffield Hallam universities. Her PhD research examines National Socialism in the Luftwaffe

THE LUFTWAFFE'S OVERCOMMITMENT AT THE HANDS OF THE RAPACIOUS NAZIS STRAINED THE AIR FORCE UNTIL IT WAS ULTIMATELY CRIPPLED FROM WITHIN

Melitta Schiller von Stauffenberg (1903–45)

Few women – and only one with Jewish ancestry – flew for the German Third Reich. **Clare Mulley** tells the story of a groundbreaking engineer, test pilot and anti-Nazi patriot

Flying exerted an irresistible magic on me..." confessed Melitta Schiller von Stauffenberg, writing that "I was dominated all along by the longing for freedom".

Melitta was 17 when she stuffed her long, dark hair into a leather flying cap and strode over to a flimsy glider for her first flight. A moment later she was soaring away from the contours of the world. In that instant, flight became the passion of her life. It was 1920, the same year that Adolf Hitler first climbed into a cockpit. His was a dramatic open biplane flight to Berlin, where he hoped to take part in the Kapp Putsch, an attempt to overthrow the Weimar Republic. "In his tight, open seat... buffeted by the wind, only one thought occupied his mind", reports later claimed: "Will we make it to Berlin in time?" He did not. Yet despite his late arrival, his airsickness and the coup's failure, Hitler, too, was thrilled by flight.

Melitta mastered flying over the following years. The early 1930s saw the dawn of the glamorous age of flight: Amelia Earhart launched a fashion line, and En Avion became the perfume of choice. At the outbreak of war, she was one of two German women – both brilliant flyers and proud patriots – who volunteered to serve their country as pilots. They were rejected: the Luftwaffe was no place for women. Yet Melitta and her nemesis, Hanna Reitsch, defied expectations to become top test pilots for the Third Reich.

Hanna was an expert glider pilot, and the first woman to fly a helicopter. When war came, she tested prototypes such as the rocket-powered Messerschmitt Me 163 Komet, though probably not under power. Later she piloted a manned version of the V1 flying bomb or 'doodlebug'. Hanna was proudly 'Aryan', casually anti-Semitic and deeply committed to the Nazi regime.

Melitta was more complex, and also arguably more useful to the Third Reich. Already an exceptional aeronautical engineer when she married Alexander Schenk Graf von Stauffenberg in 1937, she played a key role in developing equipment for planes including the Junkers Ju 87 Stuka dive bomber, which became synonymous with the blitzkrieg.

Unusually, Melitta insisted on testing her own designs. It required great strength and courage to nosedive from high altitude; Stuka pilots experienced extreme G-forces and risked losing consciousness. A pilot conducting one test dive was greatly respected. To repeat a test was considered heroic. Melitta undertook up to 15 such tests a day – more than 2,000 over the course of the war.

Melitta knew she had to make herself valuable to the regime, because her father was born Jewish (though identified as a German Protestant). Thanks to her exceptional skills, she and her family were given 'equal-to-Aryan' status. She was awarded the Iron Cross, Second Class, and nominated for the First Class award.

She was even placed in charge of her own aeronautical research institute – unheard of for a woman, let alone one considered non-Aryan, in Nazi Germany.

She never received her Iron Cross, First Class. On 20 July 1944 her brother-in-law, Claus von Stauffenberg, made an attempt on Hitler's life. Melitta's diary revealed that she had supported the plotters. She was arrested, and her in-laws were shot, hanged or sent to concentration camps. Melitta not only negotiated her own release but would later fly to the camps to take food, including rabbits she shot on the airfield, to her relatives.

On 26 April 1945, in the war's last days, Hanna Reitsch flew into Berlin under fire, visited Hitler's bunker and begged him to let her fly him out. He refused, and she flew out of Red Army-circled Berlin. Melitta had died less than three weeks earlier, shot down by an American fighter as she searched for her husband in the camps. Despite being wounded by two salvos of gunfire, she made a successful forced landing before succumbing to her injuries.

Hitler had seen flight as a political and military tool. Hanna Reitsch covetously referred to "new and fabulous realms" in the sky; a glider pilot at heart, she claimed that gliding was "the best thing in the world because [you are] carried along by a force of nature". For Melitta, however, the joy of flight was racing through what she called "the borderless sea of the air". She refused to relinquish control to the currents around her, be they atmospheric or political, instead courageously charting her own path through life as pilot and person. Ultimately, not even the Nazi regime could take her identity, self-determination or love of freedom. ■

Unusually, Melitta insisted on testing her own designs. It required great strength and courage to nosedive from high altitude; Stuka pilots experienced extreme G-forces ■

Clare Mulley is the award-winning author of historical biographies including *The Women Who Flew for Hitler* (Macmillan, 2017)



TOPFoto

A female high-flyer

Born in Prussia to a father of Jewish heritage, Melitta Schiller – later von Stauffenberg – had to battle to achieve her dreams, combining her passion for flying and engineering prowess. A proud German patriot, she was determined to serve her country, not the Nazis (unlike her nemesis, Hanna Reitsch). Having read Schopenhauer as a teenager, she realised that: "If it is not possible to live a happy life, then the only way is to live a heroic life."

PART TWO

FIGHT AND FLIGHT

/// Gradually the shock dissipated, to be replaced with cold anger. They would have their revenge against Japan ///



Doris 'Dorie' Miller shortly after being awarded the Navy Cross on 27 May 1942. The US mess attendant received the accolade for his heroism during the attack on Pearl Harbor, when he manned an anti-aircraft gun and tended to the wounded

THE DANGERS OF THE BLITZ SPIRIT



MARY EVANS



The stoicism of the British people in response to the Luftwaffe raids of 1940–41 is seen as heroic, but their defiance resulted in needless deaths. **Richard Overy** reveals why civilians were surprisingly brazen about the bombs

A casualty of the Blitz is carried to an ambulance. Between September 1940 and May 1941, the bombing campaign left 41,480 Britons dead

In November 1940, author Vera Brittain and a friend took a taxi through the ruined areas of the East End of London. On the way an air raid alarm sounded, and a policeman stopped the taxi and warned the driver and passengers to take shelter. The taxi-man glared at the policeman with "unutterable contempt" and carried on towards Bethnal Green, with the approval of his two charges. He told them that he slept every night on the top floor of a block of flats, that had no shelter, listening to the bombs falling around him. "Unless it has me name on it, it won't git me," was his conclusion. Brittain thought this was typical of the fatalism expressed by Londoners in the Blitz, firm in the belief that "destiny remains unaffected by caution". She too on occasion, at the end of a tiring day, chose to sleep in her bed oblivious to the thudding noise of the bombs and guns around her. Brittain survived, but thousands of Londoners who defied the rational impulse to shelter did not.

Bombing deaths in Britain during the nine-month German aerial Blitz on Britain were remarkably high compared with the casualties imposed by most bombing during the Second World War. Between September 1940 and May 1941, 41,480 people were killed, 16,755 of them women and 5,184 of them children. The peak month was September 1940, when 6,968 were killed; the lowest number of deaths occurred in February 1941, with 859 dead, thanks to the poor flying weather. German bombers dropped 58,000 tonnes of bombs in 1940 and 1941. British bombing of Germany in 1940 cost just 950 deaths and in 1941 a further 4,000, inflicted by 50,000 tonnes of bombs dropped by the RAF on European, principally German, targets. It took 10 tonnes of bombs to kill one German but only 1.3 tonnes to kill a Briton.

A matter of class

The popular explanation for this disparity relies on two surviving myths of the bombing war. First, that German bombing was deliberately terroristic, targeted at civilian populations to force British surrender; second, that RAF bombers only hit military targets, including factories, and spared the civilian population as far as possible. Neither of these arguments stands up to scrutiny. The German air force targets were the docks with their associated storehouses and transport facilities, the aircraft engineering industry in the Midlands, and the administrative and financial centre of London. Hitler explicitly rejected the idea of terror-bombing for its own sake, partly from fear of retaliation on German cities and partly from the

BRITISH CIVILIANS DIED NOT JUST BECAUSE OF POOR HOUSING AND SHELTER, BUT BECAUSE THEY TOOK THE RISK OF DEFYING THE BOMBS

fact that it made greater strategic sense to bomb Britain's ports and food stocks in order to force Britain to negotiate, rather than suffer the damaging effects of blockade. The RAF, on the other hand, gave up bombing only military-economic targets in 1940 and by July 1941 was formally directed to target working-class residential areas. British bombing, however, was so inaccurate that a high proportion of bombs fell on the countryside, not always harmlessly, but in districts that were sparsely populated.

Why, then, did German bombing exact such a heavy toll? Part of the answer lies in simple facts of geography. German bombers on the coast of north-west Europe were close to British targets, most of which were at or near the coast and as a result much easier to find and hit because of the coastal or estuary outline. The main ports, including London, had easily identifiable dock areas where a high concentration of bombs was dropped. Surrounding the docks was poorly constructed working-class housing, crowded with the families of dockworkers and labourers, which were regularly hit because of their proximity to the chief targets.

In the raids on Birmingham and Coventry, similar damage was sustained by the engineering industries, but here too, low-cost, crowded housing abutted the factories and suffered extensive damage, chiefly from fire. Bombing at night, even for the German air force, assisted by electronic navigation aids and high levels of training, inevitably hit the areas around the docks or factories. German airmen were not shy about killing workers and their families, but it was not their principal aim.

Yet geography is only part of the explanation. The high level of casualty was a product of British circumstances more than German 'frightfulness'. The only way to protect the vulnerable populations was to ensure that

they had adequate shelter, and to insist on a high standard of shelter discipline. Neither was the case in Britain. Shelter was most inadequate in precisely those areas where the bombing was at its heaviest. Shelter discipline, despite years of publicity on effective civil defence precautions and sensible air raid behaviour, was surprisingly lax. Every night of the bombing, thousands of people chose to defy the threat by remaining out in the open, or in bed, or in their front parlours, and every night a fraction of them were killed.

The shelter programme began well before the onset of the Blitz but it was a patchy achievement, made worse by the wide differences dictated by the British class system. Middle-class householders were much more likely to have a house with a cellar or basement to convert into a makeshift bunker, or a garden where one of the metal Anderson shelters, made available in their millions during 1940, could be dug into the earth. Better-off residents found it easier to move to the country, staying in hotels or lodgings or with friends, and in many cases already lived in the suburban outskirts rather than the crowded city centres. In poorer districts the local residents who had no access to secure public shelters, and no cellars, crowded where they could – under bridges, in tunnels, warehouse basements or caves. In London, thousands of them sheltered in the underground system, though even at the peak the stations housed only a tiny fraction of the Londoners threatened each night by the bombs.

The local authorities responded to the prospect of bombing by building a large number of the cheapest and most easily constructed shelters. These consisted of trenches and pavement shelters made of brick and concrete. The trenches were often waterlogged and in many cases without the internal construction necessary to prevent the sides from collapsing or to avoid the effects of bomb blast, which in simple trenches could kill all the occupants huddled inside. The pavement shelters, jerry-built in their thousands all over Britain, gave no protection from a direct hit, from a bomb falling nearby, or from the collapse of a nearby building. Some had thick concrete roofs which collapsed and crushed the occupants when the weaker brick walls gave way. In some boroughs there was no proper cement for low-priority building and poor-quality mortar had to be used. The result was the collapse of some of the shelters after just a heavy shower of rain.

The trench and brick shelters soon had a reputation for tragedy and the local population avoided them. By spring 1941



Londoners emerge safely from underground bomb shelters following a raid. There were public shelter spaces for just a tenth of those civilians at most risk of being bombed

Even in wartime, life went on. Here a group of Londoners in the East End gather for a cup of tea in September 1940, their windows taped over as an air raid precaution

a survey found that during raids only 7 per cent of the places in trenches and 8 per cent in brick shelters were actually occupied. In a survey carried out by the government scientist Solly Zuckerman, it was found that 51 per cent of families who stayed in cities during the Blitz either did not or could not take shelter.

Keeping options open

Both the national and local authorities knew they should try to protect the population, and millions were assisted through formal evacuation schemes, though millions chose not to leave, since it was not compulsory. There were public shelter spaces for just one tenth of the vulnerable populations and domestic shelters (which could be anything from a broom cupboard under the stairs to a well-proportioned basement) for another



Fight and flight Blitz spirit



A woman is pulled from a collapsed house in the capital, 1940. This was a time of widespread fatalism over the prospect of being hit by a bomb that 'had your name on it'

40 per cent. In the districts where shelter was most likely to be needed, however, the effort to get the population to comply with basic protection was often difficult. In Hull, for example, officials found a poor response to the offer of Anderson or brick surface shelters. In one street of 26 properties, five agreed to have a shelter, nine refused, seven failed to respond, three had nowhere to put one and two were shops. Following the city-wide survey of Hull, 1,279 households cancelled their request for a shelter. This was regarded as a free choice, but those who refused found it difficult to get a shelter when they changed their mind.

Citizens were not always free to choose whether to have a shelter or not, nor were they always free to choose to shelter if there was nowhere safe for them to go. The shelter system was rough and ready, though it improved substantially in the year following the Blitz. There were nevertheless many people who actively chose not to shelter since it was not compulsory (as it was in Germany). To a modern audience this seems a crazy decision to make. People could also fluctuate in their sheltering habits, choosing to shelter for a few days or a week and then deciding to run the risk of sleeping in their own beds. Solly Zuckerman was so puzzled by this phenomenon that he set up an investigation in 1941 based on interviews with civil defence personnel to discover whether the population was unnaturally fatalistic or else "apathetic or careless of life", but he could find no answer that satisfied him.

Dicing with death

Fatalism was certainly one of the explanations. The popular slogan that the bomb that killed you 'had your name on it' is not just a Blitz myth, but is recorded in wartime diaries and eyewitness accounts. After a flurry of sheltering in the first weeks of the Blitz in September 1940, Londoners developed a growing insouciance. A government survey found that by the end of the month the number claiming to get no sleep had fallen from 31 per cent to just 3 per cent, suggesting that many now chose to spend their nights in bed rather than propped up in shelters where there were still no proper bunks. Among civil defence recollections published during the Blitz, or shortly after, there are numerous stories of bodies dug out of the rubble of their bedrooms, or of pedestrians out on the streets after the sirens had sounded, or onlookers watching a distant raid until suddenly caught out by a random bomb.

One journalist returning to her block of flats during a raid found the caretaker and his wife sitting eating their supper as bombs

THE OFFICE BOYS GAVE UP SHELTERING BECAUSE THEY LOST TOO MUCH MONEY PLAYING CARDS WITH OTHERS ESCAPING THE BOMBS

fell outside. When she asked them why they were not afraid, the wife replied: "If we were, what good would it do us?" They carried on eating and the journalist went upstairs to bed, determined to risk the bombs as well, if the caretaker's wife could do it.

But alongside the fatalism could be found examples of exhilaration, bravado and deliberate risk-taking. The author Vera Brittain observed London's wealthy bright young things "Playing No Man's Land", dodging the bombs during a raid to go from party to party. Others confessed that they were fascinated by the spectacle, and stood and watched from unsafe roofs and balconies rather than seek shelter.

There was even a patriotic refusal to shelter, on the (certainly questionable) grounds that Hitler would have won if everyone were forced underground when the bombs started falling. One woman near Coventry decorated her home with union flags and sat under them during a raid, defiantly British. Many stories of the Blitz have highlighted the bloody-mindedness of the population, so much so that British stoicism and defiance have become embedded in popular memory of the bombing. This was not a myth. British civilians died not just because of poor housing and shelter, but because they took the risk of defying the bombs rather than kowtow to Hitler.

There was no single or simple explanation, either material or psychological, for why so many chose not to shelter automatically when the sirens sounded. An illuminating example of the variety of responses can be found in the story of another London-based journalist, the *New York Times* reporter Raymond Daniell. After the first raids in September 1940, he found that the office boys gave up sheltering after a night or so because they lost too much money playing cards with others escaping the bombing. Daniell and his colleagues stayed above ground during raids, impervious to the

request of the local air raid warden to go down to the shelter. "Go home you German pig!" could be heard every now and again shouted out by one of the office staff.

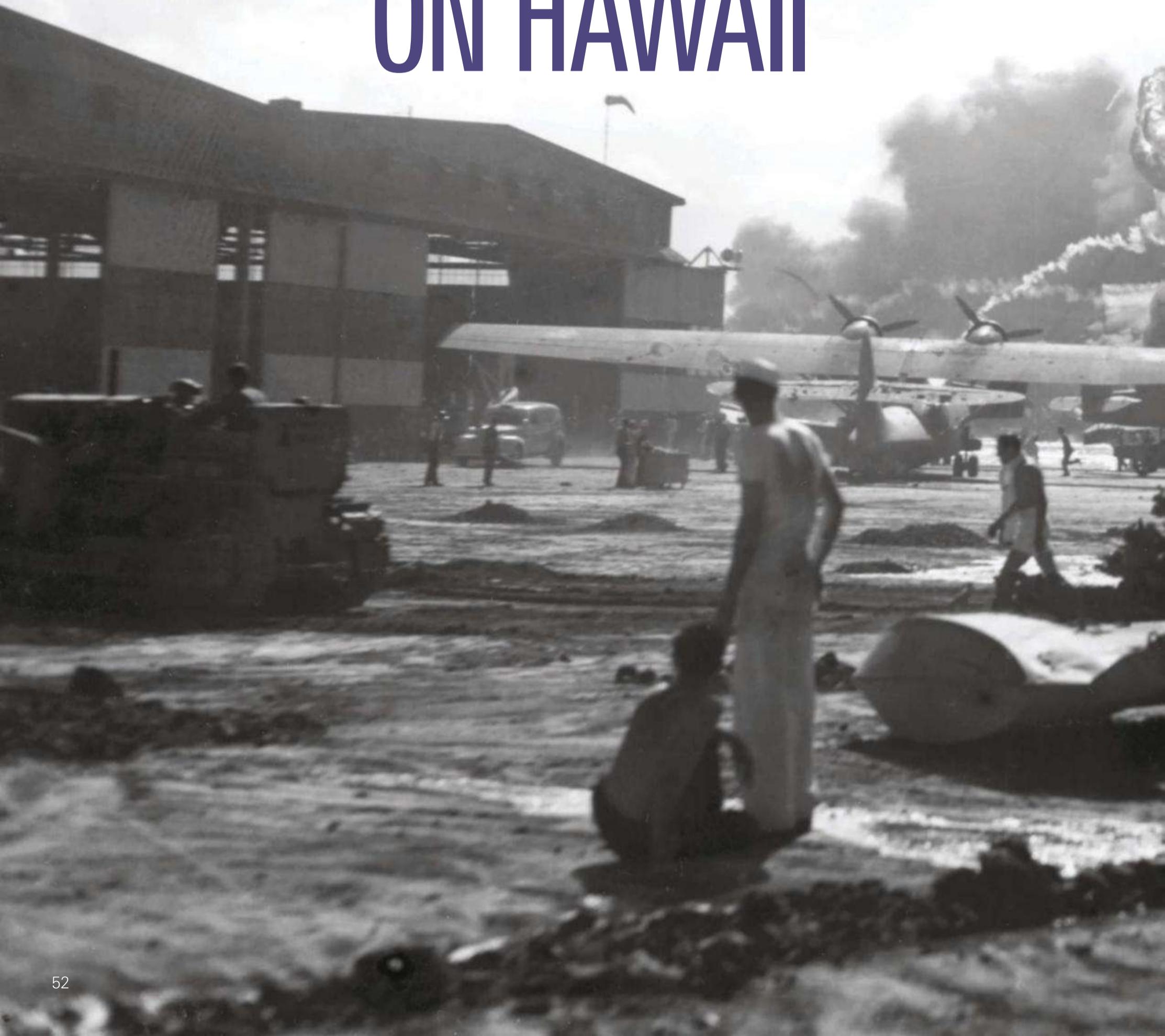
Daniell stayed in his apartment during air raids, reading and drinking. He had a driver and car at his disposal, but during raids the driver refused to shelter and instead slept in the car in case someone should try to steal the tyres. After a few weeks of sleeping uncomfortably, Daniell had made the decision to abandon safety altogether: "It occurred to me that instead of being marked for destruction I enjoyed a special immunity from bombs. From that time on I gambled on my luck and never darkened the door of a shelter again."

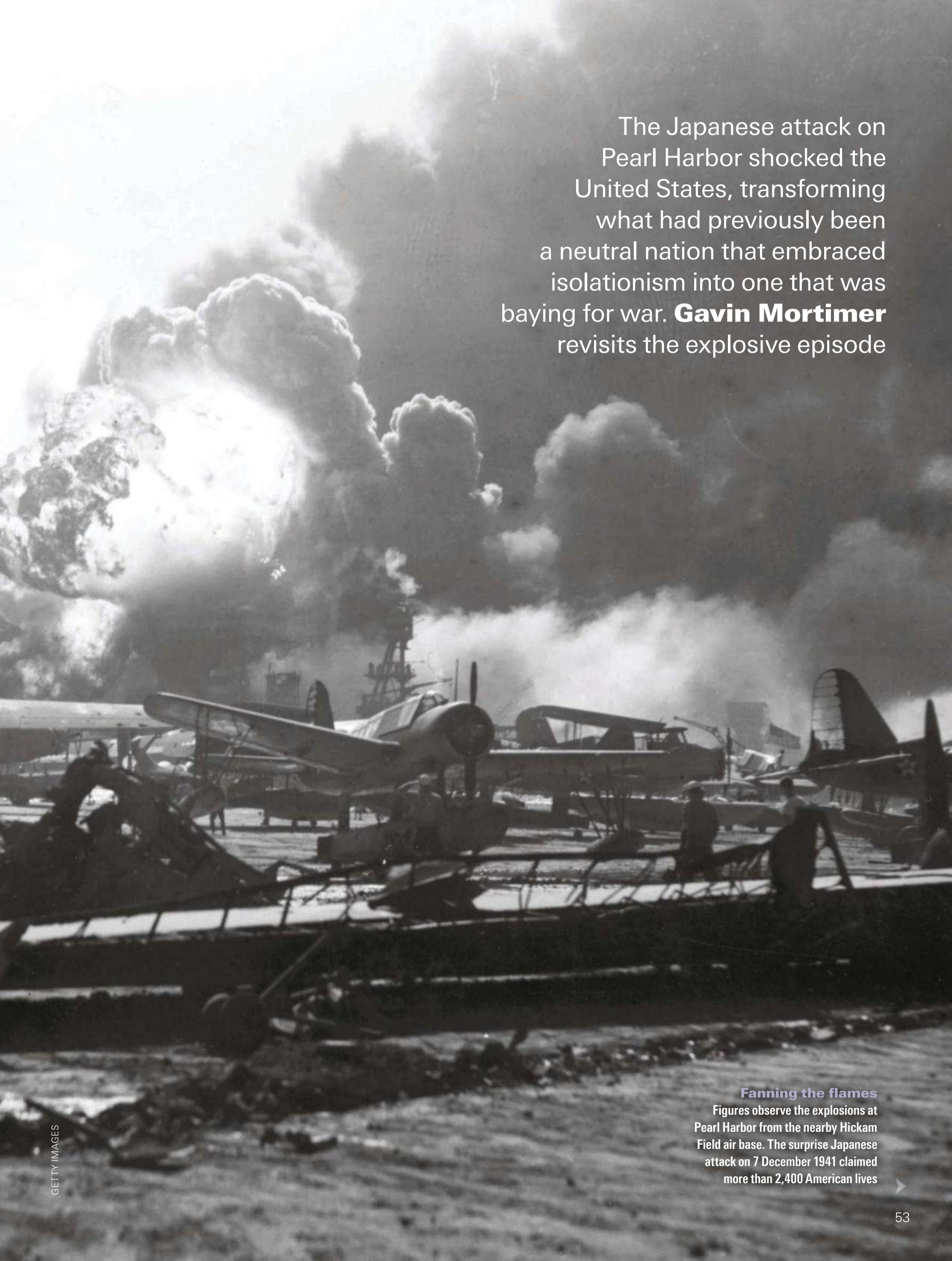
Daniell's account, written in 1941 as the bombing was going on, reveals a variety of motives for running risks, not least the widespread distrust of the clearly inadequate shelter provision. The risks were considerable, though statistically supportable. In the end only 0.23 per cent of the London population was killed. Ordinary people, of course, did not make this arithmetical calculation but they nevertheless had a sense that the gamble was not entirely irrational. Raymond Daniell recalled that "the odds on a miss were strongly in our favour". In areas with smaller populations and limited urban amenities, the damage was proportionally greater, and the response in places such as Plymouth, Hull or Southampton was a mass exodus into the surrounding countryside that continued in some cases for months after the bombing ended. Here the chance of death was higher.

The high number of dead and seriously injured during the Blitz resulted from a combination of factors – the accuracy and high concentration of German bombing, the poor level of shelter provision in the dense residential areas around docks and factories, and the poor level of shelter discipline. Choosing not to shelter had many possible causes, whether from defiance, or fatalism, or ignorance, or daring. One of the costs of the stubborn and phlegmatic British character at the heart of the Blitz story, even if it is now considered to be exaggerated or romanticised, was a higher register of dead than there would have been if the state had been more alive to the social realities facing the threatened population by providing a better shelter system or insisting on evacuation – and if the people themselves had been more willing to do what they were told. H

Richard Overy is professor of history at the University of Exeter. His next book, *Blood and Ruins: A History of the Second World War*, is due to be published by Penguin in 2021

WHEN HELL RAINED DOWN ON HAWAII





The Japanese attack on Pearl Harbor shocked the United States, transforming what had previously been a neutral nation that embraced isolationism into one that was baying for war. **Gavin Mortimer** revisits the explosive episode

Fanning the flames

Figures observe the explosions at Pearl Harbor from the nearby Hickam Field air base. The surprise Japanese attack on 7 December 1941 claimed more than 2,400 American lives

Fight and flight Pearl Harbor



All smiles

Japanese diplomats face the press after peace talks at the White House, around 10 days before the raid



Calm before the storm

Submarines of the US Fleet docked in Hawaii, September 1940. Japan thought attacking the fleet would destroy morale

GETTY IMAGES

It was the end of the Sunday morning shift on 7 December 1941, and for Privates Joseph Lockard and George Elliott, it had been uneventful – like almost any other shift at the Opana Mobile Radar Station. Situated near Kahuku Point on the northern tip of Oahu, the third-largest of the Hawaiian Islands, the station was operated on a part-time basis. Shortly before the clock struck seven o'clock in the morning, Elliott reminded Lockard that he needed training in using the oscilloscope.

As Lockard looked at the radar display while he was preparing to teach Elliott, he gave a murmur of surprise. There was something unusual on the oscilloscope. "Must be a flight of some sort," said Lockard. He and Elliott stared at the image. They agreed the aircraft, which were approximately 137 miles north of the island, numbered "more than 50".

Elliott called the Information Center at Fort Shafter, 30 miles south, and spoke to Lieutenant Kermit Tyler, a pursuit officer whose role was to assist the controller in ordering planes to intercept enemy aircraft. On this particular Sunday, Tyler was the only officer in the Information Center, with neither the controller or the aircraft identification officer on duty. Lockard shared what he could see on his screen, describing the "direction, the mileage and the apparent size of whatever it was". It was big, he emphasised: the "biggest sightings he'd ever seen".

For a moment, Tyler was nonplussed. But then a thought struck him. For most of the night the local radio station had been playing Hawaiian music, and he had heard from a bomber-pilot friend that this had a secret meaning: it acted as a radio beam for the American aircraft en route to the island from the mainland. The radio beam was classified information, so Tyler could not relay it to Lockard; instead he told the radar operator, "don't worry". The aircraft were American, of that he was sure.

Schemes and spies

Exactly 12 months earlier, Admiral Isoroku Yamamoto, commander-in-chief of Japan's Combined Fleet, had conceived the idea of a surprise attack on the US naval base at Pearl Harbor "to give a fatal blow to the enemy fleet". He expanded on his idea in a letter to Admiral Koshiro Oikawa, the navy minister, declaring that if Japan's imperialist ambitions in the Pacific were to be realised they must strike first, and strike with such ferocity that "the morale of the US Navy and her people... would sink to the extent that it could not be recovered".

YAMAMOTO DECLARED THAT IF JAPAN'S IMPERIALIST AMBITIONS WERE TO BE REALISED THEN THEY MUST STRIKE FIRST, AND STRIKE WITH FEROCITY

The target he had in mind, Pearl Harbor, was home to the US Pacific Fleet. It was an audacious plan – so audacious that the Americans had never seriously entertained the thought that Pearl Harbor might be targeted. After all, as General George Marshall said to President Franklin D Roosevelt in May 1941, they felt it was "the strongest fortress in the world". Even if the Japanese were foolish enough to strike, they would "come under air attack at a distance of approximately 750 miles". And the firepower would only increase as they got nearer to Hawaii, which itself would be defended by 35,000 troops and powerful coastal guns.

Japan knew all about the defences of Pearl Harbor because of Takeo Yoshikawa, their top spy, who had arrived in Honolulu the previous March posing as a diplomat. In the same month that Marshall boasted to Roosevelt about the impregnability of Pearl Harbor, Yoshikawa was passing on to his superiors the identities and locations of enemy battleships.

Throughout the summer of 1941 Japan and the US maintained diplomatic talks, but these were a charade for the Japanese. They now had a codename for the impending attack – Operation Hawaii – and they had decided to strike on a Sunday morning, when their enemy's guard would be at its lowest. There were occasional rumours circulating in Washington concerning a possible Japanese attack, and in October an intelligence report warned of a "bomb plot", but neither Admiral Kimmel, commander-in-chief of the US fleet, nor Lieutenant General Walter Short, the military commander responsible for the defence of US military installations in Hawaii, were informed of the message.

By the end of November the facade of diplomatic negotiations had worn thin. US Secretary of State Cordell Hull received from the Japanese what he described as "an ultimatum" in which they demanded unlimited oil supplies, an end to the US freeze on its assets, and the discontinuation of aid to China. In exchange all they offered was the partial withdrawal of troops from

Indochina. Even as the Japanese handed the offer to Hull, their task force was assembling in the remote Hitokappu Bay in the north-east of Japan.

On 23 November Admiral Chūichi Nagumo, commander of the First Air Fleet, informed his officers that "our mission is to attack Pearl Harbor" in a strike that would entail a two-wave attack of more than 350 aircraft.

Three days later the task force sailed for Pearl Harbor, 3,500 miles to the east. Comprising six aircraft



Architect of war

Isoroku Yamamoto, commander-in-chief of the Combined Fleet, planned the attacks for more than a year

Fight and flight Pearl Harbor



Wings of death A squadron of Japanese navy planes flies above a fleet of warships a fortnight after the attacks. Some 350 aircraft were involved in the raid itself, wreaking havoc and slaughtering thousands



Falling like dominoes A Japanese pilot's view of the attack on 'Battleship Row' at Pearl Harbor. All eight battleships anchored there suffered severe damage, with four of them sinking in the harbour

carriers, two heavy cruisers, one light cruiser, two battleships, nine destroyers and eight tankers (23 fleet submarines and five midget submarines sailed separately), the men of the task force were exultant at the prospect of inflicting a mortal blow. "An air attack on Hawaii!" wrote Seaman Iki Kuramoto in his diary. "A dream come true. What will the people at home think when they hear the news?"

"Tora! Tora! Tora!"

At 7.40am on Sunday 7 December, Mitsuo Fuchida got his first sight of the 96 vessels of the Pacific Fleet at anchor in Pearl Harbor. He was the commander of the first wave of aircraft – 183 in all (two had failed to take off), composed of 43 fighters, 49 high-level bombers, 51 dive bombers and 40 torpedo planes. None of the three American aircraft carriers were in port, but that initial disappointment was assuaged when Fuchida saw how closely the enemy ships were positioned to one another. "I have never seen ships, even in the deepest peace, anchored at a distance of less than 500 to 1,000 yards from each other," he recalled. "This picture down there was hard to comprehend."

Also lined up invitingly were the American aircraft, on the orders of General Short, who a week earlier had received a "war warning" from Washington. He was

Fading fast

The destruction of USS *Arizona* alone – seen here burning furiously – resulted in the loss of 1,177 personnel



adamant that if an attack came it would be a sabotage operation, a commando raid against the airfields, so he opted to mass the planes and increase the perimeter guard.

The navy patrol seaplane base in Kaneohe Bay, on the east coast of Hawaii, was hit first at 7.53am – exactly the same moment that Fuchida radioed to the task force: "Tora! Tora! Tora! (Tiger! Tiger! Tiger!)", the codewords to confirm the enemy had been caught unawares. One flight of Lieutenant Commander Shigeharu Murata's torpedo bombers targeted the west side of Pearl Harbor, while the other headed for 'Battleship Row', where *Arizona*, *California*, *Vestal*, *Maryland*, *Nevada*, *Oklahoma*, *Tennessee* and *West Virginia* were anchored.

Adone Calderone was having breakfast on board *West Virginia* when an 848-kilogram torpedo struck the forward ammunition magazine at one minute past eight. "We were sitting there, having a cup of coffee, and pretty soon, wham!" he said. Several more 'whams' followed as torpedoes struck the port side, ripping gaping wounds in the hull through which water gushed. Calderone was sent below into a compartment to help counterflood *West Virginia* to stop it rolling over and capsizing. As he and six others frantically worked to save the ship, the waters around them rose. "I looked at that and said, 'Well, this is it,'" recalled Calderone. "We were trapped."

Then one of the men remembered there was an air vent in the adjoining compartment that led to the top deck. "We were trained about going under water," Calderone

"OKLAHOMA BEGAN TO ROLL OVER ON HER SIDE UNTIL ONLY HER BOTTOM COULD BE SEEN... IT WAS AWFUL, FOR GREAT SHIPS WERE DYING BEFORE MY EYES"



said. "Take two deep breaths and go under. You hold that as long as you can, then let the air out. Then you have about 10 seconds left. Then you die." Calderone swam through the long thin tube until, his lungs feeling as though they were about to burst, he reached the deck. He was greeted by a scene of devastation. "There was fire all over the place," he recalled, as Japanese fighters "machine-gunned anything they could".

One crew member fighting back on *West Virginia* was a mess attendant second class called Doris 'Dorie' Miller, one of the few black men on board. Emerging on deck, Miller was told by an officer to man one of the .50-calibre Browning machine guns. He had not been trained in gunnery, but Miller did as instructed, later being rewarded for his heroism with a Navy Cross. "It wasn't hard," he said. "I just pulled the trigger, and she worked fine."

The second wave arrives

West Virginia remained afloat, but the end of *Arizona*, anchored at quay F-7 on Battleship Row, was witnessed by Admiral Kimmel as he arrived at his HQ at 8.10am. In mute horror he saw *Arizona* "lift out of the water, then sink back down – way down", taking with it 1,177 of its 1,512-strong crew.

A similar fate befell *Oklahoma*, with its death throes being witnessed by a Mrs Earle, who was watching from her front garden. "Slowly, sickeningly, *Oklahoma* began to roll over on her side, until, finally, only her bottom could be seen," she recalled. "It was awful, for great ships were dying before my

POWER TO THE PEOPLE

The Japanese believed that attacking Pearl Harbor would obliterate American morale – but it had the opposite effect



United in shock

New Yorkers jostle to pick up newspapers in Times Square after learning of the attack.

A sense of comradeship was felt throughout the US

The Japanese gravely misread the American people in believing that the attack on Pearl Harbor would shatter their morale. On the contrary, the 'sneak attack' united the country in a way that Japan had not imagined.

Overnight the 'isolationists' – those Americans who had long advocated neutrality – abandoned their opposition to conflict. "The circumstances of the Japanese attack on Pearl Harbor were such that national unity was an instant consequence," reported *The New York Times* on Monday 8 December. "You could almost hear it click into place in Washington today."

Hours after the raid, President Franklin D Roosevelt met with his cabinet and then with a delegation of representatives from the senate and congress. On 8 December the president made his iconic 'Day of Infamy' speech (see page 58), and congress passed

a formal declaration of war on Japan.

The febrile atmosphere in Washington was felt throughout the country as rumours – fake news, in modern parlance – abounded that Japan had launched attacks on Hawaii. Newspapers vied with each other for the most sensationalist editorials, with the *Los Angeles Times* declaring that the Japanese attack "was the act of a mad dog, a gangster's parody of every principle of international honor".

Armed guards were posted outside German and Italian embassies as crowds gathered in the capital, but a reporter from Washington's *Evening Star* noted that the overriding emotion wasn't anger. "Folks wanted to be together," he wrote. "Strangers spoke to strangers. A sense of comradeship of all the people was apparent."

The US was at war, and the people were determined to win.

eyes." Across the island, Japanese aircraft wrought havoc, destroying ships and aircraft and wounding thousands of Americans at the base – but not, crucially, targeting the dry docks or fuel depots.

At 8.40am, the second wave of Japanese aircraft neared Hawaii. The 54 horizontal bombers of Lieutenant Commander Shigekazu Shimazaki's flight had in their sights the US airfields at Hickam, Kanehoe and Ford Island, while 78 dive bombers under the command of Lieutenant Commander Takashige Egusa began attacking what remained of the Pacific Fleet. The instructions for the 36 Zero fighters were to shoot up whatever they could at Kanehoe, Hickam, Ford Island, Wheeler Field and Bellows.

At the seaplane base at Kaneohe Bay, Aviation Machinist Mate Third Class Guy Avery watched as the Zeros "cruised over us, firing sporadically at any likely target". One of the pilots was Fusata Iida, who came in low and opened fire on the station armoury. Suddenly, recalled Avery, an aviation ordnance man named Sands stepped out of a doorway with a Browning automatic rifle (BAR) and fired a long burst at the enemy aircraft. "Hand me another BAR!" he yelled. "Hurry up! I swear I hit the bastard."

Iida swooped for another attack just as Sands opened fire again and "emptied the rifle at the roaring Zero". The aircraft wobbled and then veered out of control, smashing into the road just below one of the married officers' quarters. It was a rare success for the Americans in the morning when hell came to Hawaii. At 9.55am Lieutenant Saburo Shindo circled Pearl Harbor and then radioed his assessment report to Commander Minoru Genda: "Inflicted much damage."

A day of infamy

As the Japanese aircraft returned to their carriers, hundreds of badly wounded sailors were taken to Ford Island, where the commander's daughter, Mary Ann Ramsey, helped tend to them. "We covered the men with sheets and tried to reassure them that transport to sick bay was forthcoming," she wrote later. "A sailor told me, tears streaming down his cheeks, how his best friend was blown apart in front of him; another was grieving over the loss of his brother. From many there was only the deadly silence of shock, or the soft moaning of pain."

Of the 350 aircraft that attacked Pearl Harbor, only 29 failed to return, while one fleet and five midget submarines were lost. Euphoria was the overriding emotion among the Japanese task force, but Mitsuo Fuchida told Admiral Nagumo they should refuel and return to destroy the dockyards and fuel



Up in arms

Roosevelt requests that congress declares war against Japan on 8 December 1941. Arguments in favour of US isolationism effectively disappeared overnight

storage tanks. Nagumo ignored the advice; at one o'clock in the afternoon, he told the task force to turn "to the north at 26 knots".

That evening in Washington, President Roosevelt informed his cabinet that 18 vessels (eight battleships, three light cruisers, three destroyers and four auxiliary craft) had been sunk, capsized or damaged, 188 aircraft destroyed, 2,403 people killed, and 1,178 wounded. Furthermore, Japan had invaded Thailand and British Malaya and carried out a wave of deadly aerial attacks against Guam, Hong Kong, the Philippines, Singapore and Wake Island.

Late into the night, Roosevelt fine-tuned the speech he would make the next day to a joint session of the US Congress. He wanted to keep it short and to the point, powerful and pithy so that congress would back his declaration of war. The address lasted seven minutes, and it was broadcast live across the country on the radio. "Yesterday," he began, "December 7th, 1941 – a date which will live in infamy – the United States of America was suddenly and deliberately attacked by naval and air forces of the empire of Japan."

In Pearl Harbor, Adone Calderone and his crewmates surveyed the wreck of *West Virginia*. One-hundred-and-six of their crewmates were dead, and the survivors were still in shock. But gradually the shock dissipated, to be replaced with cold anger. They would have their revenge against Japan. "We didn't win at Pearl Harbor," reflected Calderone, "but they didn't win the war." **H**

**THAT EVENING
ROOSEVELT INFORMED
HIS CABINET THAT
18 VESSELS HAD BEEN
SUNK, CAPSIZED
OR DAMAGED,
188 AIRCRAFT
DESTROYED AND
2,403 PEOPLE KILLED**

Gavin Mortimer is a historian and author. His books include *The Men Who Made the SAS* (Constable, 2015) and *Guidance from the Greatest* (Constable, 2020)

BBC

FROM THE MAKERS OF BBC HISTORY MAGAZINE

GREAT BATTLES OF WORLD WAR TWO

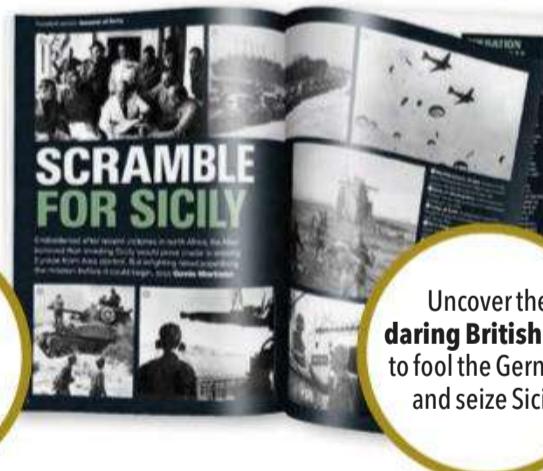
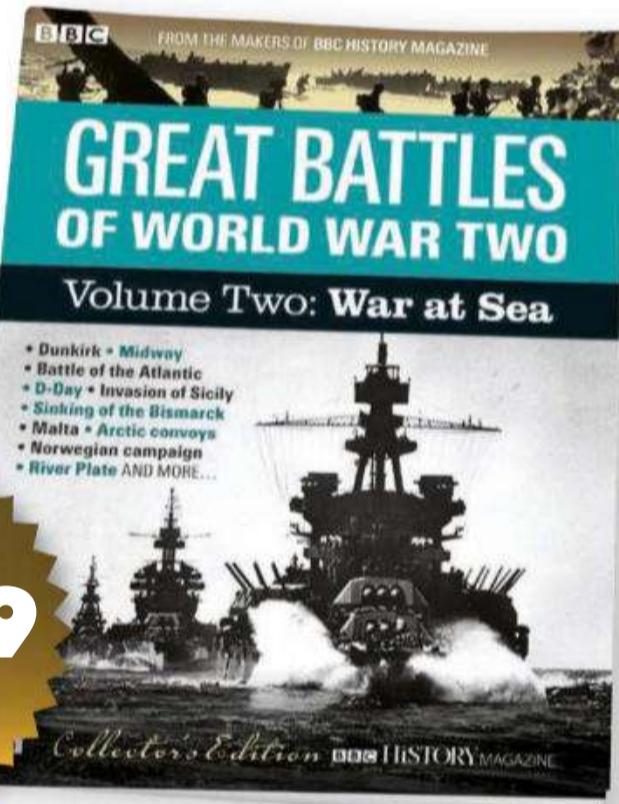
Volume Two: War at Sea

This second volume of our *Great Battles of World War Two* series looks at the encounters that shaped the war on the waves. Discover:

- The inside story behind the Allied evacuation of Dunkirk
- Why the US triumphed at the battle of Midway
- How the Merchant Navy remained resilient in the Atlantic
- The top-secret 'war game' that destroyed German U-boats
- Why the battle of the Philippine Sea paved the way for Japan's downfall

**PLUS - FREE UK postage
on this special edition**

ONLY
£9.99
INCLUDING
FREE P&P*



Order online www.buysubscriptions.com/WarAtSea
or call us on **03330 162 138⁺** and quote WW2 WAR AT SEA

+ UK calls will cost the same as other standard fixed line numbers (starting 01 or 02) and are included as part of any inclusive or free minutes allowances (if offered by your phone tariff).

Outside of free call packages call charges from mobile phones will cost between 3p and 55p per minute. Lines are open Mon to Fri 9am - 5pm.

*UK residents receive FREE UK POSTAGE on this special edition. Prices including postage are: £9.99 for all UK residents, £12.99 for Europe and £13.49 for Rest of World.

All orders subject to availability. Please allow up to 21 days for delivery.

BOMBER BOYS

Patrick Bishop tells the story of Britain's bombing offensive against Germany, and explains why the controversial campaign was a case of good men being asked to do a very ugly job



On the morning of Sunday 31 May 1942, Britain woke up to some grimly satisfying news. The previous night, a thousand bombers had flown to Cologne and dropped nearly 1,500 tonnes of bombs on the city, killing up to 486 people.

The newspapers could barely contain their glee. "The vengeance begins!" shouted the *Daily Express*. "The ruins of Cologne are hidden under a pall of smoke rising 15,000 feet after the first thousand-bomber raid in history." It reported one pilot as saying that the skies over Cologne had been "as busy as Piccadilly Circus".

The triumphant tone of the *Express* chimed with the mood of its readers. Bombing Germany had the almost unanimous support of the population. Britons prided themselves on their phlegmatic character and sense of fair play. But the experience of the Blitz the previous winter had changed all that. Some 40,000 people had been killed and hundreds of acres of London and other important cities laid waste.

Whatever reluctance the public might have felt to retaliate disappeared with the Luftwaffe raid on Coventry on the night of 14 November 1940. It was the most concentrated attack of the Blitz. About 560 people were killed and more than half the homes in the city destroyed or damaged. Coventry was full of war industry factories and therefore a legitimate target by Britain's own rules of war.

Nonetheless, the scale and the brutality of the violence swept away any sentiment for restraint. Before the raid, semi-official surveys of what was being said in the pubs and cafes of Coventry recorded that people were not in favour of taking the war to Germany, for fear of what might be done in reprisal. Afterwards, however, the mood shifted decisively. A report by the pioneering social study group Mass Observation noted one young man as saying, "we're fighting gangsters, so we've got to be gangsters ourselves. We've been gentlemen too long."

After Coventry, the gloves came off and stayed off. The slow but relentless escalation of the RAF campaign took place against a background of general approval. George Orwell's famously tender conscience was untroubled by the "thousand" raid on Cologne. The Germans, he declared, in a radio broadcast a few days afterwards, deserved no quarter.

"In 1940, when the Germans were bombing Britain, they did not expect



Heavy duty

TOP A pair of Vickers Wellington bombers, February 1940. The long-range aircraft took part in the first raid on Cologne in May 1942

ABOVE A Lancaster pictured with the so-called 'blockbuster' bomb, which could flatten an entire block of houses

retaliation on a very heavy scale," he said. "[They] were not afraid to boast in their propaganda about the slaughter of civilians which they were bringing about and the terror which their raids aroused. Now, when the tables are turned, they are beginning to cry out against the whole business of aerial bombing... The people of this country are not revengeful, but they remember what happened to themselves two years ago, and they remember how the Germans talked when they thought themselves safe from retaliation."

Mixed results

By mid-1943, Britain had more than paid back Germany for what it had done. There was, however, no question of easing up, and bombing continued with ever-increasing fury until the end of the war.

There were several reasons why the campaign remained at the centre of the British war effort, but its initial importance was as much political as military. Crucially, it was the only means the government had of hitting Germany on its own territory. The sight of the bombers overhead cheered the home front and showed the world that someone was prepared to stand up to Hitler.

The effect of the raids was far from impressive, however. Before the war, extravagant claims had been made by air power theorists for the might of the bomber. In practice, Bomber Command sustained terrible losses in the early days without anything like commensurate results. In the first two years of the war it lost 4,823 men and 2,331 aircraft on operations. In that time it dropped only 35,194 tonnes of bombs – 2,000 tonnes less than it had dropped in the single month of May 1944.

Despite the great effort, the resulting destruction was often small and the casualties minimal. A typical night's work was that of 29–30 August 1941, when more than 140 aircraft were sent to attack railways and harbours in Frankfurt. They reached their target successfully and began bombing, managing to inflict some damage to a gasworks, a barrel warehouse and a few houses. However, during the course of the operation, seven aircraft and the lives of 16 of the crew were lost.

Navigation aids were primitive, and the crews' main problem was finding the target. In bad weather, bombs were sometimes dropped on the wrong towns or on decoy fires lit in open countryside. The arrival of radio and radar directional devices, such as Gee, Oboe and H2S, was a great help in getting aircraft to the right place, while the development of tactics using Pathfinder

"WE'RE FIGHTING GANGSTERS, SO WE'VE GOT TO BE GANGSTERS OURSELVES. WE'VE BEEN GENTLEMEN TOO LONG"

Fight and flight Bomber Command



A bombed factory water supply in Nuremberg, April 1945. Crippling Nazi Germany's war industries was a key aim during Britain's bombing campaign

German civilians flee a bombing raid, April 1945. The morality of the attacks was debated both during and after the war



crews (which could mark the point of attack with colour-coded flares and bombs) also improved precision. Then, as the big four-engined bombers – the Stirling, Halifax, and above all, the Lancaster – came into service, the weight of bombs the RAF could drop increased enormously.

A troubling legacy

Yet Bomber Command remained a blunt instrument. There were occasional “rapier thrusts” like the Dams raid of May 1943 led by Guy Gibson (see page 68), but most of the work was done with the bludgeon. In the battles of the Ruhr, Hamburg and Berlin, launched the same year, Bomber Command set out to destroy whole cities through what became known as “area attacks”. The aim of the raids was to smash the factories and works that powered the German war effort. But given the inability to deliver bombs precisely, this inevitably caused the deaths of huge numbers of civilians. The Hamburg operation alone killed 40,000. By the end of the war, the death toll had reached 600,000.

The killing of civilians, though publicly regretted, was thought to have potentially beneficial consequences. Indeed, directives

IN SEARCH OF SUPERIORITY

How Britain's bombs left Germany overstretched

Britain had been wedded to the notion of strategic bombing since the end of the First World War. Strategic thinkers soon created a conventional wisdom that held that the next war would be won by the country with the heaviest air power. Giant air fleets would lay waste the war industry of the enemy in its own territory, crippling its ability to fight, so the theory ran.

The doctrine certainly fitted Britain's circumstances, as an island that could not attack its foes by land. Germany, by contrast, never invested in heavy bombers, using the Luftwaffe as an adjunct to blitzkrieg (lightning war), blasting a path from the air for its invading armies.

However, technological shortcomings, particularly in navigation, meant that the ambition of devastating the factories and power sources of the Nazi war machine proved very hard to achieve. Increasingly, the towns that they were housed in became the targets. By the end of the war, the 70 major German towns that had been attacked had suffered at least 45 per cent destruction of their built-up areas.

The campaign only started to have a decisive effect on war industry towards the end of the conflict, and nor did it bring about the predicted collapse of civilian morale. Nonetheless, Bomber Command's efforts were a vital part of Allied grand strategy. From 1942, intensive operations forced German high command to concentrate on the air defence of Germany and give up hope that they could rebuild their bomber fleet and launch a new blitz on Britain.

The priority given to defending the Reich meant that outside it, the Allies eventually achieved air superiority. Without that, the campaigns in Africa and Italy could not have succeeded and the D-Day landings would have been impossible. It also meant that on the eastern front, the German army was deprived of the air support to which it had been accustomed.

BOMBER CREWS RECEIVED NOTHING LIKE THE POSTWAR HONOUR AND PRAISE THAT WAS SHOWERED ON THE PILOTS OF THE BATTLE OF BRITAIN

named the undermining of German morale, and particularly that of industrial workers, as a primary goal. It was this aspect of the operation that lay at the heart of postwar criticism of the campaign.

In the end, some 70 German cities were ruined by Allied bombing. It was Bomber Command's ruthless and energetic chief, Sir Arthur Harris, known as 'Bomber' to the press but as 'Butch' by those who flew for him, who bore the brunt of postwar revulsion at the destruction. But no matter how enthusiastically and unswervingly he may have pursued the policy, the idea of pulverising cities had not originated with him.

As Harris pointed out in his memoirs: "There is a widespread impression that I not only invented the policy of area bombing but also insisted on carrying it out in the face of a natural reluctance to kill women and children that was felt by everyone else. The facts are otherwise. Such decisions are not in any case made by commanders-in-chief in the field, but by the ministries, the Chiefs of Staff Committee and by the War Cabinet. The decision to attack large industrial areas was taken long before I became commander-in-chief."

This was true. For much of the war, Harris's boss – Chief of the Air Staff Sir Charles Portal – was a vigorous advocate of the policy. But towards the end he veered away from area bombing in favour of more precise attacks, and afterwards succeeded, as did Churchill, in distancing himself from the controversy. Long before the conflict was over it was clear that there would be trouble. Inside Britain, deep misgivings had been voiced by politicians and churchmen while the battle was still raging. The loudest dissenting voice in parliament belonged to Dick Stokes, the Labour member for Ipswich, who challenged both the utility and the morality of the campaign.

Few Britons shared his misgivings. The 'Bomber Boys' were very popular. They were bringing the war to Germany and dying in huge numbers in the process. The attitude of the country was summed up in a poem by Noël Coward:

*Lie in the dark and listen
It's clear tonight so they're flying high
Hundreds of them, thousands perhaps,
Riding the icy, moonlit sky.
Men, material, bombs and maps,
Altimeters and guns and charts,
Coffee, sandwiches, fleece-lined boots
Bones and muscles and minds and hearts
English saplings with English roots
Deep in the earth they've left below,
Lie in the dark and let them go,
Lie in the dark and listen.*

But when the war ended, Bomber Command's activities became an embarrassment. Germany was to be an important ally in the Cold War, and despite the huge sacrifice they had made, praise for the crews was lukewarm or non-existent. Churchill barely mentioned the bombing campaign in his victory speech. Hugo Sperrle, commander of German Air Fleet Three, was not charged at Nuremberg with war crimes relating to the Blitz, for fear of drawing attention to the damage done to German cities.

In Britain, the bomber crews received nothing like the postwar honour and praise that was showered on the pilots of the Battle of Britain. They even became the targets of satire, with the irreverent young comedians of the *Beyond the Fringe* theatre revue among those taking aim during the early 1960s. In one sketch entitled 'The Aftermyth of War', it is by no coincidence that "Perkins" – who is told by a senior RAF officer to make "a futile gesture to raise the whole tone of the war" – happens to be a bomber pilot.

Changing views

The survivors kept their resentment to themselves, but behind closed doors, they occasionally let it show. A speech by Marshal of the Royal Air Force Sir William Dickson at Five Group's first major reunion, 30 years after the war ended, gives an idea of their sense of hurt.

Dickson, who had served on the Joint Planning Committee, asked why it had taken so long to arrange the gathering. He believed, "it may... have something to do with a growing resentment and indignation, shared by the whole air force and many outside it, towards some who belittle the strategic air offensive against Germany. Some of these little people try to turn the

Fight and flight Bomber Command

Rubble and ruins

This photograph of Cologne in 1945 shows the extent of bomb damage across the city – to military targets and civilian buildings alike



THE BRUTALITY CHARGE WAS NEVER WIDELY ACCEPTED IN BRITAIN, BUT THE RETICENCE ABOUT BOMBER COMMAND PERSISTED FOR DECADES



GETTY IMAGES

truth upside down to sell their books or for some vested interest. We particularly resent the argument that the offensive was ineffective and caused needless casualties”.

It was not until the 1960s that the work of Bomber Command began to be properly assessed. It started with the publication in 1961 of an iconoclastic official history by Sir Charles Webster and Noble Frankland, who had served as a bomber navigator. It paid full tribute to the courage of the crews, but made clear that their achievements were limited. The great area offensive, they concluded, “did not produce direct results commensurate with the hopes once entertained and at times, indeed, feared by the Germans themselves”. Huge areas of Germany’s great towns had been laid waste, “but the will of the German people was not broken or even significantly impaired and the effect on war production was remarkably small”.

The claim that the effect on war production was negligible has since been convincingly challenged. But as Dickson said, it was the charge of brutality against the civilian population that rankled most, resurfacing in the 2000s following the English-language publication of Jörg Friedrich’s *The Fire: The Bombing of Germany, 1940–1945*, which emphasised in detail the suffering that the bombing generated.

The brutality charge was never widely accepted in Britain, but the reticence about Bomber Command persisted for decades. Indeed, it wasn’t until 2012 that a permanent national memorial to Bomber Command was finally erected in London, followed by the opening of the International Bomber Command Centre in Lincoln six years later.

It was ultimately the Bomber Boys’ misfortune to be good men who were asked to do an ugly job. But that does not mean it was not necessary. ■

Patrick Bishop is an author, journalist and historian. His books include *Bomber Boys* (HarperPress, 2007) and *Air Force Blue: The RAF in World War Two* (William Collins, 2017)



EYE OPENER

Blazing a trail

A group of Tuskegee Airmen gather around the camera in Italy, date unknown. Initially formed as the 99th Pursuit Squadron in January 1941, the Tuskegee Airmen became the first African-Americans to take to the skies as members of the US military. Trained at the Tuskegee Army Air Field in Alabama, the airmen flew 15,533 sorties over Europe and north Africa between May 1943 and June 1945, winning more than 850 medals between them.



Fight and flight Dambusters raid

Mission accomplished

Water spews through the crippled Möhne Dam

following the Dambusters raid of May 1943

BELOW Guy Gibson (centre), leader of Operation

Chastise, in front of a Lancaster bomber in

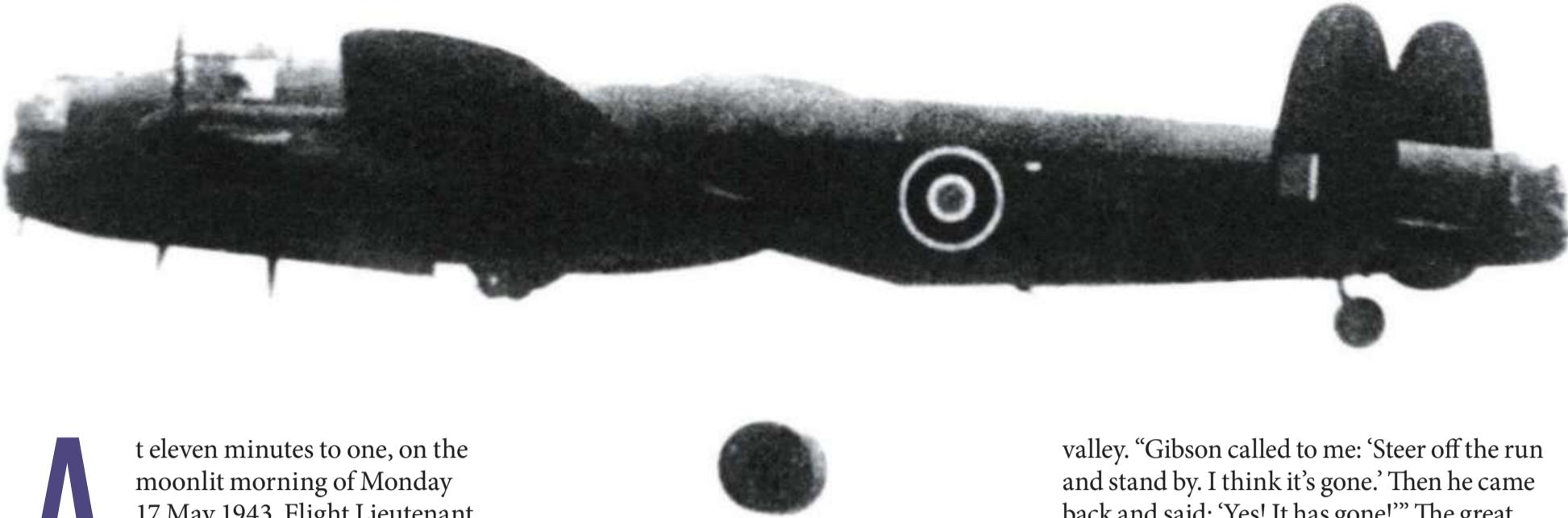
c1943. Alongside him are squadron leaders

John Searby (left) and Peter Ward-Hunt



THE TRIUMPH OF THE DAMBUSTERS

Keen to cripple the German war machine, the Allies masterminded a daring bombing raid to take out the Reich's dams – and hamstring their industrial might. Although some have painted the attack as a mere PR exercise, **James Holland** argues that it genuinely dealt a significant blow



At eleven minutes to one, on the moonlit morning of Monday 17 May 1943, Flight Lieutenant David Shannon was circling over a headland just a couple of miles to the east of the Möhne Dam, one of the best-known – and largest – structures in the entire German Reich. Shannon and his crew in their Lancaster L-Leather were anxiously watching one of the first wave of attackers, Flight Lieutenant David Maltby in J-Johnny, speed towards the dam wall at a little over 220 miles per hour and at just 60 feet above the water. Sixty feet – it was nothing, the height of 10 men.

From the dam and both sides, arcs of tracer were pumping towards the Lancaster and those of Wing Commander Gibson and Flight Lieutenant Martin, flying either side to try and draw away the enemy flak.

Then the Upkeep, the specially designed depth charge, was dropped, spinning, from underneath Maltby's plane, and skipped over the water towards the dam wall. Shannon, an Australian about to celebrate his 21st birthday, watched the huge explosion moments later, a plume of water rising a thousand feet into the air. But despite this, the dam appeared to hold fast. Five Lancasters had now made attack runs and two – those of Maltby and, before him, Squadron Leader Young – appeared to have struck the structure perfectly. Yet still the dam had not broken.

Over his headset, Shannon heard Gibson tell him to prepare to attack. Perhaps this sixth bomb would do the trick. Or perhaps the inventor, Barnes Wallis, had been wrong. Perhaps it could not break the dam after all.

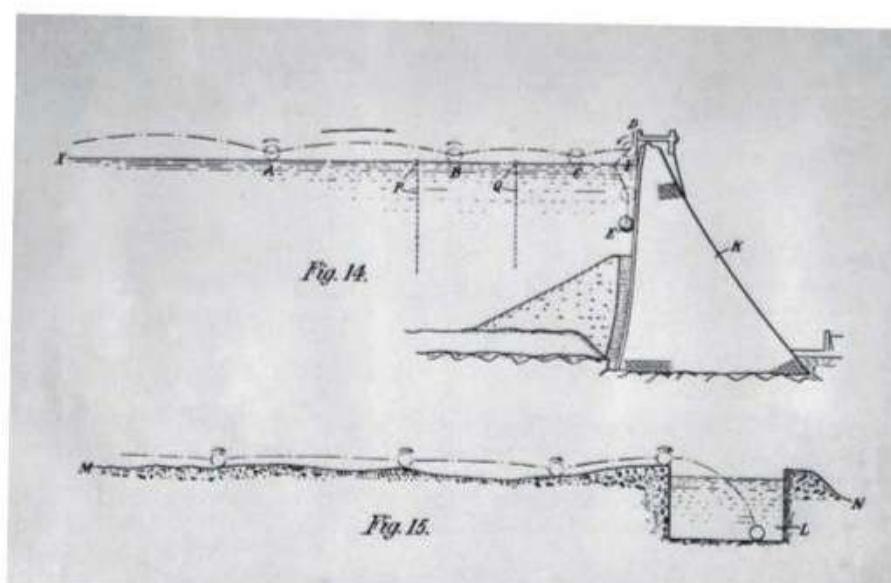
Shannon began his run, swooping low over the headland towards the water and switching on the two beam lights that would give him the exact height needed of 60 feet. The Australian saw both Martin and Gibson moving into position on either side of him to draw the flak. "And then," recalled Shannon, "there was an excited yell over the R/T. 'It's gone! It's gone!'" The whole wall had collapsed and the water had started spewing out down the

"IT'S GONE! IT'S GONE!" THE WHOLE WALL HAD COLLAPSED AND THE WATER HAD STARTED SPEWING OUT DOWN THE VALLEY

Deadly precision

ABOVE A Lancaster carries out live testing of an Upkeep bouncing bomb off the coast near Reculver, Kent, around May 1943

BELOW A drawing from 1943 illustrating the trajectories of bouncing bombs aimed at a dam



valley. "Gibson called to me: 'Steer off the run and stand by. I think it's gone.' Then he came back and said: 'Yes! It has gone!'" The great Möhne Dam, so crucial for controlling the lifeblood of water to the industrial heartland in the Ruhr valley, had been destroyed.

Later that night, the attackers also wrecked the Eder Dam, 50 miles to the south-east, and badly damaged the Sorpe – which, like the Möhne, was key to controlling the water supply needed for the steel works, especially, in the Ruhr.

To say that this was a bold and daring operation – and a huge gamble of lives and much-needed aircraft and resources – is a massive understatement. RAF Bomber Command had been slowly but surely improving its navigational equipment during the previous 12 months, but had long before accepted that pinpoint bombing accuracy was unachievable. Instead, Air Marshal Sir Arthur Harris, commander-in-chief of Bomber Command, had determined that the key to success was flying large numbers of heavy bombers with equally large numbers of bombs over targets from as safe a height as possible – and at night.

Changing the game

Barnes Wallis, however, had other ideas. Assistant chief designer at Vickers-Armstrong Aviation, he had long been convinced that the way to win the war was to paralyse Germany's war machine. In between his aircraft work, he had been developing ideas for potentially war-changing weapons, including the bouncing bomb. Having convinced enough people that the weapon could work against the

German dams, Operation Chastise, as it was called, was swiftly put into action. At the time, it was regarded as a great success.

In recent times, however, it has become widely accepted that the raid, while providing Britain with a much-needed morale boost, was a good PR exercise that otherwise achieved little. After all, eight of the 19 crews never made it home, an unacceptable loss rate of more than 40 per cent. In any case, all three dams were rebuilt by that autumn, just five months later.

UNLIKELY HEROES

An inexperienced crew who beat the odds

However, the study of German records in no way supports this view. The damage caused was enormous. Not only were two major dams completely destroyed, so too were seven railway bridges, 18 road bridges, four water turbine power stations and three steam turbine power stations. Meanwhile, in the Ruhr valley alone, 11 factories were razed and a further 114 damaged, many severely. Vast tracts of land had also been devastated by the tidal waves that had thundered up to 80 miles from the dams.

For the Germans this was a 'katastrophe' – and the smashing of the dams is today still labelled as such. It was true that in 1943, Germany still had enough reserves of water to ensure steel production was not unduly affected, but were the dams to remain broken the following year, then war production would be seriously compromised. It was therefore absolutely essential that they be rebuilt by the autumn, in time to catch the winter rainfall. And even then, the Germans had to pray that winter was not drier than usual.

It is much to the credit of the armaments minister, Albert Speer, that this was achieved, but it came at a huge cost – not just financially, but also in terms of manpower, materials, and sheer logistical effort. On Speer's request, a staggering 70,000 men from Organisation Todt were transferred to the area, with a large number of Dutch and French labourers being moved from the Atlantic Wall. New temporary timber-framed railway and road bridges were hastily erected, while entire railway lines were constructed alongside huge walls of scaffolding to bring stone and materials to the dam walls. On top of that, at both the Eder and Möhne, the Germans built new barracks blocks to house the thousands of labourers working there.

Even the Sorpe Dam, damaged but not destroyed, had to be emptied because one of the points of impact was 12.5 metres below the parapet and had created a crater more than eight metres wide and with damage right through the width of the dam.

The effort and vast expense of repairing the dams in such a short time was astronomical. Worse still for the Wehrmacht, it now felt compelled to build elaborate anti-aircraft defences, not just on these three but on every single dam of any substance in Germany. And these defences had to be supplied and manned. The photographs taken of the

Barnes Wallis, with considerable help from scientists and engineers from the Ministry of Aircraft Production, had discovered the previous year that the explosive effect of the bouncing bomb would be much greater if detonated at depth against a dam wall. Yet it was not until 26 February 1943 that Operation Chastise was finally given the green light.

At the time, however, Barnes Wallis was in danger of being hoisted by his own petard. The time to strike was when water levels were highest, in mid-May, and with the light of a full moon.

That gave the project just 10 weeks, otherwise it would have to be postponed for another year. Yet Wallis had not even finished the designs for his weapon at that point in time. Nor did he know how feasible it would be for Avro to specially adapt a number of Lancasters to carry and deliver the weapon to the targets.

And nor had the squadron yet been formed to carry out the operation. 617 Squadron was created on 24 March with Guy Gibson as its commander. In his book, *Enemy Coast Ahead*, Gibson implied that he had personally chosen every

pilot and that the squadron was very much the 'Top Gun' of Bomber Command, the best of the best.

This was not really the case, however. Gibson personally knew just three of the 22 pilots, although he certainly requested the American, Joe McCarthy, and would have been aware of Micky Martin's reputation for low flying.

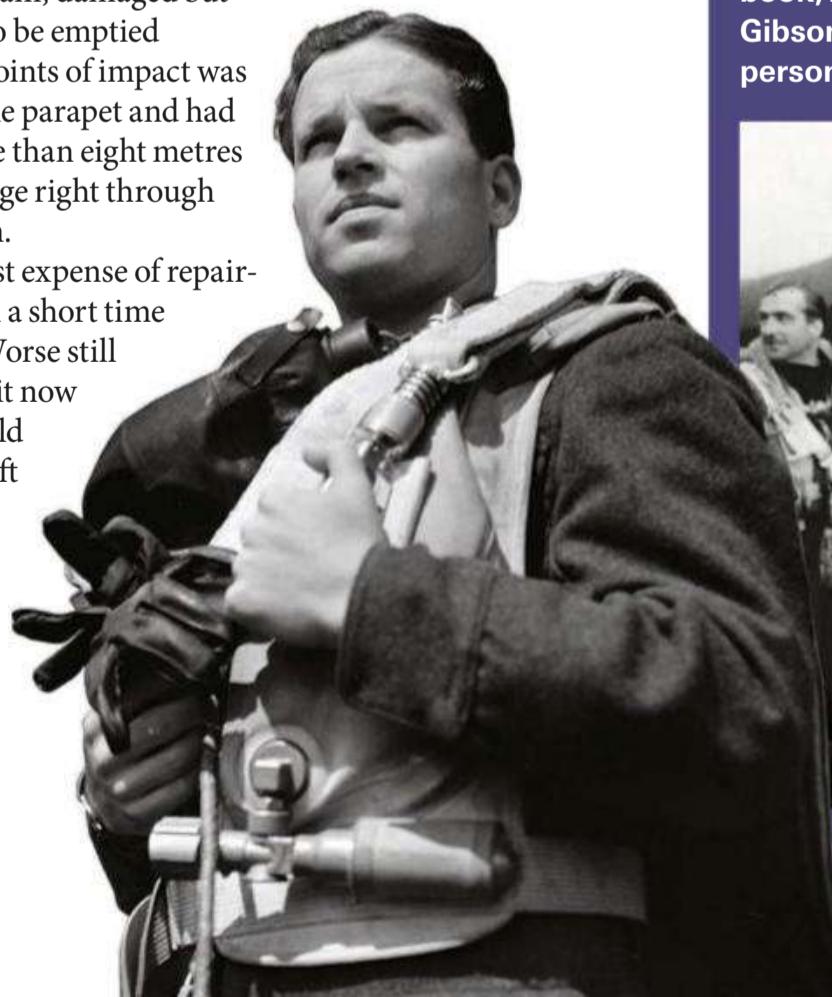
As a guideline, crews were to have finished or nearly completed one tour of 30 operations. Some were obvious choices because they fitted that bill, but that still left a shortfall.

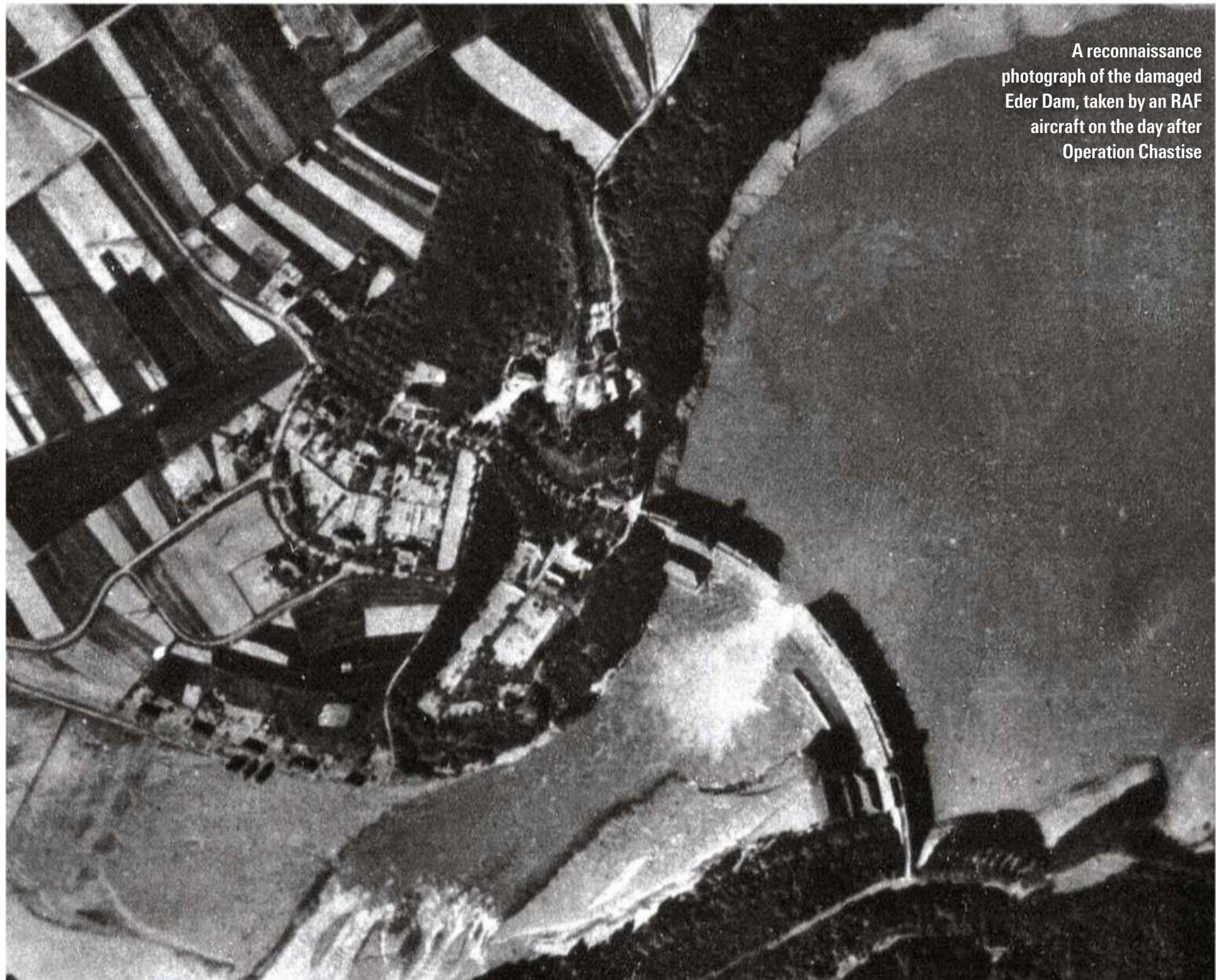
At this point, it was left to individual station commanders to find the rest. Les Munro volunteered because he saw a notice asking for crews to do so. He had a scant 22 operations to his name, but others had even fewer. Geoff Rice had no more than a handful, for instance, while Vernon Byers had just four, and Cyril Anderson and Ken Brown only seven each.

During training, most crews added around 50 hours' flying time, but this hardly made them the *crème de la crème* of the Allied air forces. It makes their achievement even more astonishing.



Guy Gibson (second right) and his crew board their Lancaster for the Dams raid, May 1943





A reconnaissance photograph of the damaged Eder Dam, taken by an RAF aircraft on the day after Operation Chastise

reconstruction efforts – carried out simultaneously – demonstrate what an enormous undertaking this was.

It is also true that those destroyed and damaged factories were up and running again in comparatively short time. However, many of the components required were not readily available and had to be taken from elsewhere; the Ruhr's gain came at the expense of factories elsewhere in the Reich.

In other words, the speed with which the dams were rebuilt doesn't serve to undermine the effect of the raid. On the contrary, it underlines just how important the dams were to Germany – especially at such a critical point in the war. In February the Germans had surrendered at Stalingrad; a further 250,000 men had capitulated in north Africa a few days before the raid; while at the height of the reconstruction, the Wehrmacht was facing the invasion of Sicily and the catastrophic counterattack at Kursk. If there was ever a moment when the Germans needed to avoid diverting resources from the front, it was then.

Furthermore, the Dams raid, carried out by just a handful of aircraft, played on the

THE DAMS RAID PLAYED ON THE NAZI HIGH COMMAND'S WORST FEARS – THAT THE ALLIES COULD ACHIEVE WIDESPREAD DESTRUCTION WITH ONLY A HANDFUL OF AIRCRAFT

Nazi high command's worst fears – that the Allies could achieve similar kinds of destruction at will with a small force. Moreover, the dams, giant feats of engineering, were known and admired throughout Germany. The psychological blow the raids dealt the Germans was arguably far greater than the psychological boost they gave the British and Americans.

The Möhne Dam was reinaugurated on 3 October the same year. A month later, Field Marshal Rommel was given command of Army Group B in the west, with the specific task of protecting the Channel coast. He was appalled to discover that the much-vaunted Atlantic Wall was more a concept than reality. Perhaps, however, he should not have been surprised when so many of the wall's workers had been transferred to repair the dams. It was a diversion of resources that would cost Germany dearly in June the following year. ■

James Holland is a historian, author and broadcaster. His latest book is *Sicily '43: The First Assault on Fortress Europe* (Bantam Press, 2020)

THE ALLIES' BIG IDEA

For D-Day to succeed, the Allies had to wrest control of the skies over western Europe from the Luftwaffe.

James Holland explains how the 'Big Week' raids of February 1944 helped to secure this aerial supremacy



Fight and flight Big Week

Tuesday 11 January 1944: high over Germany, as an American combat bomber wing battled its way home, a lone P-51 Mustang, one of the US 8th Air Force's new fighters, was single-handedly defending the entire formation from an onslaught of enemy fighter attacks.

Its pilot was Major Jim Howard, who had been leading the 354th Fighter Group that afternoon. As he had first dived down on the enemy along with the rest of his group, he had seen a Messerschmitt Bf 110 heading straight for the bomber wing's lead B-17 Flying Fortress – and had opened fire. A moment later he raked a Messerschmitt Bf 109, then sped after another fighter and opened fire, seeing the pilot bail out. In less than a minute he had shot down three enemy fighters.

Howard had found himself alone and was about to withdraw, when he realised there was no sign of the fellow American fighters due to take over escorting the bombers. So he climbed back up, throttling back and turning to take on any enemy fighter that tried to get near the B-17s. For more than half an hour, the American stayed with the Fortresses, diving and aggressively attacking any German fighter that appeared, driving them off again and again. Only when all the enemy fighters seemed to have gone did Howard finally waggle his wings to the B-17s and head for home. Not a single Fortress of the 401st Bomb Group had been shot down while Howard protected them. In the course of that mission, meanwhile, he had shot down four confirmed and very probably two more aircraft, and seen off as many as 30 enemy fighters.

A matter of urgency

Howard's was an exceptional display of flying, but it also demonstrated how good Allied fighter pilots had become. By the start of 1944, American and British fighter pilots were joining their squadrons with 350 hours of flying in their logbooks, while US squadrons now had as many as four times the number of pilots and planes needed to keep 16 aircraft airborne on any mission. Fighter pilots in the US 8th Air Force were confident and adept, and had superior aircraft to the enemy. In contrast, new Luftwaffe pilots were arriving into their units with as few as 110 flying hours under their belts, and thanks to Germany's chronic fuel shortages, had little chance to practise. In fact, these young pilots had little chance full stop. They were being slaughtered.

Although the Luftwaffe's glory days were over, it remained worthy of respect. Factories



Bombs away

MAIN Flying Fortresses were key to the success of Big Week

INSET Air Marshal 'Bomber' Harris – pictured here looking at reports of bombing raids in February 1944 – was sceptical of the rationale behind the campaign

THE ALLIES HAD TO HAMMER THE GERMAN AIRCRAFT INDUSTRY, BUT MOST OF THE FACTORIES SUPPLYING THE LUFTWAFFE WERE DEEP IN THE REICH

were producing thousands of new aircraft each month, while the Germans had recently developed a sophisticated air defence system (involving a combination of radar, radio, ground observers, and control rooms that included glass-lighted screens to plot air traffic over occupied Europe). No Allied aircraft could fly over the Reich without the Luftwaffe knowing about it. There were now some 15,000 anti-aircraft guns defending Germany, while hundreds of day and, crucially, night fighters were being directed to intercept Allied bombers, which were suffering horrifically.

This all contributed to a sense of crisis engulfing the Allied air forces. Not only was the bomber offensive against Germany not working decisively, but the Allies didn't have the air superiority over western Europe needed for Operation Overlord – the continental mainland invasion planned for early summer.

While Air Marshal Sir Arthur Harris,

BIG WEEK IN NUMBERS

Number of bombers in action

 3,800

 2,351

Bombs dropped

 10,000 tonnes

 9,198 tonnes

Number of planes lost

 254

 157

 2,121

75% of German aircraft industry targets were destroyed or damaged by Allied bombing raids

a long-range fighter. Only in the nick of time did the Allies realise that the solution to their pressing issue was under their noses.

The RAF had had the opportunity to make Spitfires long-range, but due to Bomber Command's continuation of night bombing had not thought it necessary. However, in 1943, US technicians had equipped a P-51 Mustang with a Rolls-Royce Merlin 61 rather than its standard Allison engine, and the fighter's performance and fuel economy had improved astonishingly. Additional fuel tanks made little difference to its speed or manoeuvrability. Suddenly, in the Mustang, the Allies had a fighter capable of flying nearly 1,500 miles – to Berlin and back with ease. This was a game-changer, as Jim Howard would prove on 11 January 1944.

Gearing up to fight

At the end of November 1943, the United States Strategic Air Forces issued a new directive, Operation Argument, an all-out offensive against the Luftwaffe and the enemy's aircraft industry. Raids were held back, however, by the poor weather that descended on Europe that winter. Not until the third week of February 1944 was there a break – and the chance to deliver the spell of high-pressure bombardment required.

By February 1944, the 8th Air Force was considerably larger than it had been in November 1943, and the fighters were also employing better tactics. General Carl 'Tooeey' Spaatz, the new head of the American air forces in Europe, had ordered fighters to hunt down, engage and destroy Luftwaffe planes rather than to close-escort all bomber formations, and also to attack airfields on the ground. The bomber commanders were appalled by what they saw as a lack of protection for their planes, but it was

commander of RAF Bomber Command, remained convinced that area bombing – the blanket bombardment of entire neighbourhoods – could win the war, US and British war chiefs accepted there could be no invasion of France until they had cleared the skies. This meant gaining air superiority not only over the Normandy beaches, but also over a large swathe of north-west Europe. Success or failure would depend on whether the Germans could launch a massed counterattack within days of the landings, before the Allies could successfully reinforce any bridgehead. In the nine weeks leading up to D-Day, therefore, Allied forces had to carry out a heavy 'interdiction' operation: blowing up bridges, roads and, especially, railways and marshalling yards.

This interdiction campaign was to be largely the preserve of the tactical air forces: two-engine medium bombers and ground-attack fighters, which would be operating at lower heights than heavy

bombers and with greater accuracy. To perform successfully, they needed to be doing so in skies where the Allies held air superiority. At the beginning of 1944, US and British chiefs were a long way short of achieving this. The clock was ticking.

Unlike Harris, the Americans understood that disabling the Luftwaffe was a matter of urgency. In the second half of 1943, Germany's growing defensive strength had shown that only heavily escorted B-17 and B-24 bombers could get to their targets. Losses on raids to aircraft factories, once to Regensburg and twice to Schweinfurt, deep inside Germany and beyond fighter range, had been substantial.

This was the crux: the Allies had to hammer the German aircraft industry, but most of the factories supplying the Luftwaffe were deep in the Reich, where the daylight bombers and even Bomber Command at night could not reach effectively. What was needed, urgently and in large numbers, was

Fight and flight Big Week

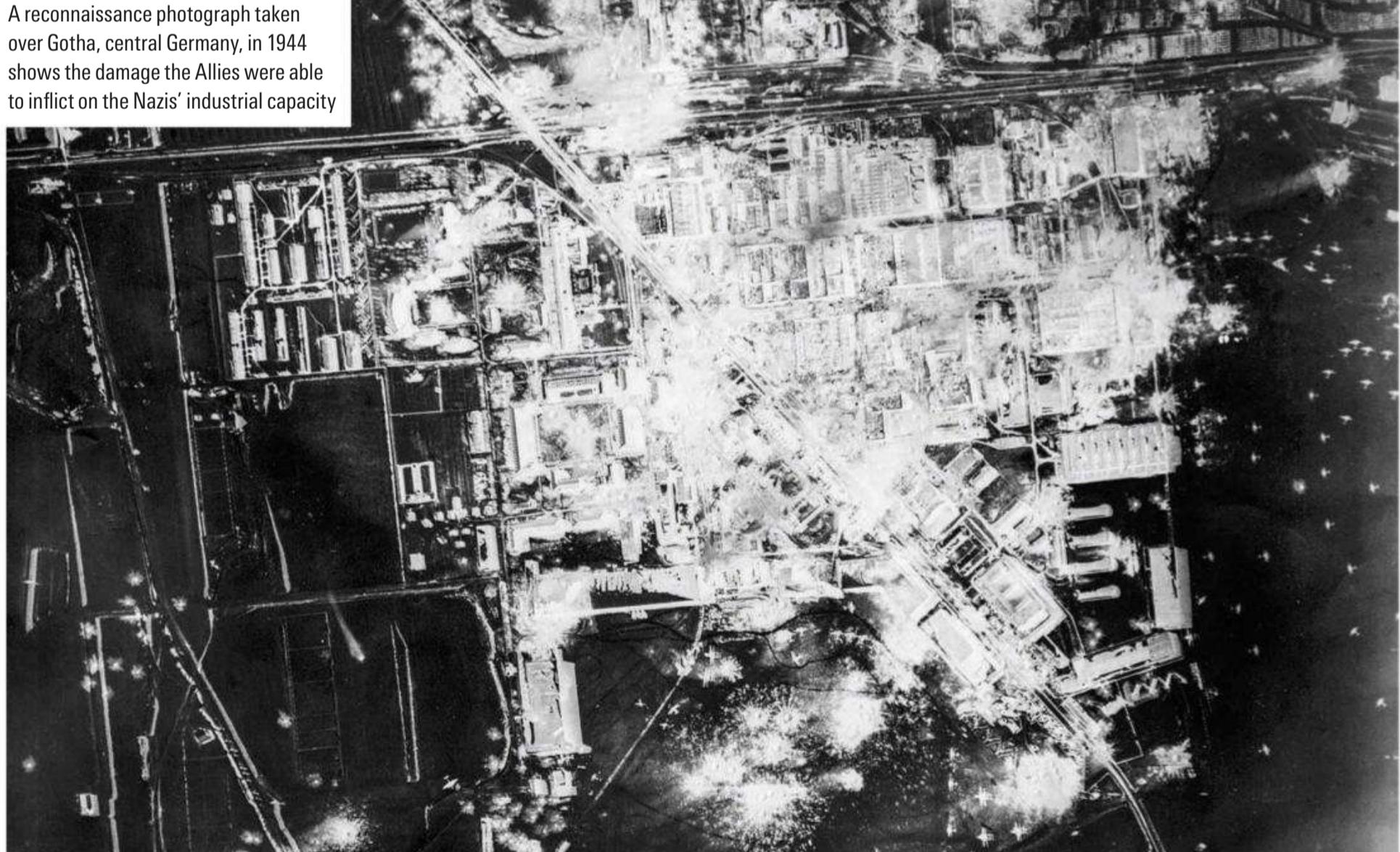


Fighting shape

A Messerschmitt Bf 109 production line churns out fighters for the Luftwaffe

Wiped out

A reconnaissance photograph taken over Gotha, central Germany, in 1944 shows the damage the Allies were able to inflict on the Nazis' industrial capacity



GETTY IMAGES

unquestionably the right decision. By the third week in February, the Americans had the tactics and skills, as well as the aircraft, with which to deliver a mortal blow to the Luftwaffe.

Operation Argument began with Harris's reluctant cooperation. Bomber Command targeted aircraft plants in Leipzig on the night of Saturday 19 February. It was a bloody sortie. Among those shot down was Flight Lieutenant Julian Sale's crew from 35 Squadron who – like most who failed to return – were shot down by night fighters using upward-firing cannons that raked the vulnerable undersides of their aircraft. It was the second time Sale and his navigator, Gordon Carter, had bailed out over enemy territory; they had made it back the first time, but would not be so lucky on this occasion (Sale died, while Carter became a prisoner of war).

Flight Lieutenant Rusty Waughman and his 101 Squadron crew did reach home safely. "Pretty deadly trip," he noted in his logbook. "Lost 78 aircraft." This was a huge number from one mission, and a reminder, if any were needed, of the deadly power of the Luftwaffe's night-fighter force.

Nonetheless, Leipzig was hammered and was to be hit again the following day. On Sunday 20 February, 'Big Week', as it would come to be known, got under way in earnest with the heaviest round-the-clock Allied attacks ever witnessed. US bomber crews had to get up at 3am. "Awakened very early today," noted Larry 'Goldie' Goldstein, radio operator in a B-17 in the 388th Bomb Group, "and expected a long, rough mission, even long before briefing." He was not wrong. To cause maximum strain on the Luftwaffe, the 8th struck multiple targets, with the 388th Bomber Group attacking the city of Poznań in Poland.

Also flying was Major Jimmy Stewart, Hollywood star and now a squadron commander in the 445th Bomb Group of B-24 Liberators. Both Stewart and Goldstein made it back that day, but the carnage was considerable, and the raging air battle across Europe saw episodes of extraordinary bravery. No fewer than three Congressional Medals of Honor were won; the only time in the history of the US air forces that more than one was awarded for a single mission. One recipient was Lieutenant William Lawley, who managed to fly his battered B-17 and surviving crew back and crash-land safely, despite having received multiple head, leg and arm shrapnel wounds, and with a decapitated co-pilot strapped in beside him. Lawley had been lucky: the other two medals were posthumous.

Stuttgart was the next target on Monday

21 February, with many of those who had been in action the previous day, including Goldie Goldstein and crew, flying yet again. Tuesday 22 February saw another maximum effort, and this time the 8th was joined by the 15th Air Force, operating from Italy and attacking aircraft plants at Regensburg and Prüfening. While the bombers from both Italy and England suffered, so too did the Luftwaffe, who were rising up, as the Allies hoped, to meet this immense and concentrated onslaught.

Men against boys

One of those German pilots was Oberleutnant Heinz Knoke. His fighter group, Jagdgeschwader 11, should have had 36 fighters, but could muster a mere five that day. Knoke was hugely experienced, having been shot down five times already; the same could not be said for his wingman, Feldwebel Krueger. Together they dived down on some Fortresses and Knoke saw a bomber erupt into flames – then, a moment later, a Messerschmitt flamed downwards too.

JAMES STEWART LOOKED UP AT HIS SCARRED LIBERATOR BOMBER AND SAID TO ONE OF HIS CREW: "SOMEBODY COULD GET HURT IN ONE OF THOSE DAMNED THINGS"

Actor and pilot James Stewart is honoured by the French in 1945



"It was my wingman, the young corporal," noted Knoke. "This was his first mission."

Bad weather prevented further flying on Wednesday 23 February, which gave the groundcrews precious time to repair battle-damaged aircraft. "Heavies from Italy and Britain plaster bomb-drunk Reich," ran the headline in the US forces newspaper, *Stars and Stripes*. The Luftwaffe leadership was in a state of shock. The Germans had lost 58 fighters on the Sunday alone, and a further 32 and 52 on subsequent days. Messerschmitt plants in Leipzig were badly damaged, too.

Big Week continued on Thursday 24 with attacks on Gotha, while Bomber Command also struck Schweinfurt. Before the surviving RAF crews were back on British soil, the 8th was preparing for another day of bombing. "No rest as the air blitz on German aircraft production continues," noted Goldie Goldstein. "Up and at them again today." It was his third mission that week, and another he was lucky to survive. So too was Jimmy Stewart, whose B-24 Liberator was badly hit over Nuremberg. Behind him, he saw another B-24 burst into flames, dive and smash into the bomber beneath it, so the two flaming aircraft fell at once. Back on the ground, Stewart looked up at his scarred Liberator and said to one of his crew, "Sergeant, somebody could sure get hurt in one of those damned things."

Big Week ended that night, when Bomber Command sent 594 heavy bombers to hit the Messerschmitt plants at Augsburg. Some 2,920 buildings in the town were destroyed in this culmination of a week of unprecedented violence and destruction. A further 5,000 were severely damaged, including the MAN diesel facility, with more than 3,000 casualties recorded.

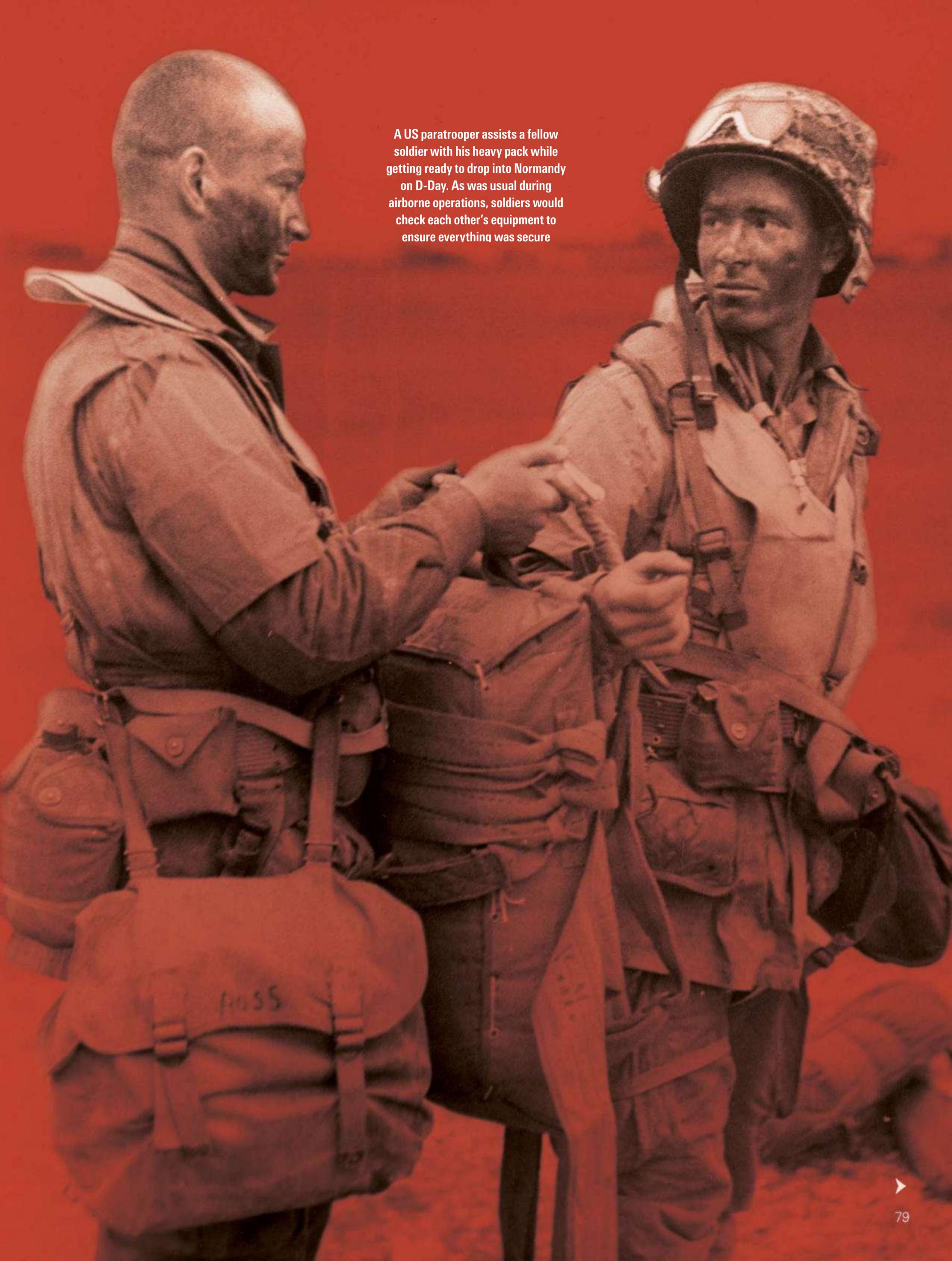
Big Week was finally over, as the weather closed in once more. The massive air assault had dealt the Luftwaffe a catastrophic blow. Aircraft losses amounted to a staggering 2,605 in February 1944 alone, but the most significant impact was on Germany's stock of pilots. Such attrition was totally unsustainable. Experienced flyers were being removed, while the new boys were arriving with scant training and little hope of survival. As more pilots were shot down in March and April, the Luftwaffe largely withdrew into the Reich. By April, the all-important air superiority requirement had been met, and the invasion of France could proceed. The critical damage, however, had been done in the great air battle of Big Week. H

James Holland is a historian, author and broadcaster. His latest book is *Sicily '43: The First Assault on Fortress Europe* (Bantam Press, 2020)

PART THREE

THE FINAL DESCENT

After jumping, the paratroopers floated down to earth in fear. 'A moment of terror seized me,' recalled one serviceman



A US paratrooper assists a fellow soldier with his heavy pack while getting ready to drop into Normandy on D-Day. As was usual during airborne operations, soldiers would check each other's equipment to ensure everything was secure

Waiting to jump

US paratroopers on board a C-47 skytrain prepare for their descent into Normandy during the early hours of 6 June 1944. Poor weather and enemy fire resulted in men being dispersed over a wide area



RISKING IT ALL

Despite warnings that casualties would be sky high, General Eisenhower was adamant that an assault from the air had to go ahead on D-Day. **Gavin Mortimer** explains why the risk of the operation was, in the eyes of the Allies, worth the reward



GETTY IMAGES



General Dwight Eisenhower listened as Sir Trafford Leigh-Mallory outlined his opposition to the plan to drop thousands of American Airborne troops on the Cotentin peninsula, a few miles inland from the beaches on which the Allied invasion force would come ashore on D-Day. The air chief marshal, commander-in-chief of the Allied Expeditionary Air Forces for the Normandy invasion, informed Eisenhower of the latest intelligence reports, which indicated that the Germans had strengthened their anti-airborne defences in the region. To attempt such an operation would result in disaster, warned Sir Trafford, with a casualty rate of around 75 per cent.

Having absorbed the grim forecast, Eisenhower, commander of the Supreme Headquarters Allied Expeditionary Force (SHAEF), summoned Lieutenant General Omar Bradley, leader of the US 1st Army. The two American Airborne Divisions, the 82nd and the 101st, were under Bradley's command, so what was his opinion?

"I conceded that Leigh-Mallory's low-flying C-47s [troop-carrier aircraft] would run into ground fire almost from the moment they made landfall in France," remembered Bradley. "Those risks, I asserted, must be subordinated to the importance of Utah beach and to the prompt capture of Cherbourg." Of course, said Bradley, he valued the lives of 17,000 airborne troops, "but I would willingly risk them to insure against the failure of the invasion".

Utah was to be the most westerly of the five invasion beaches on D-Day, which was initially planned for 5 June 1944. Four exits would lead inland from the beach, and the task of the 82nd and 101st would be to secure the low marshy ground that the landing troops of the 4th Infantry Division would advance through. Bridges would need to be blown, roads mined and villages seized; ultimately, the objective was for the airborne

TO ATTEMPT SUCH AN OPERATION WOULD RESULT IN DISASTER, WARNED SIR TRAFFORD, WITH A CASUALTY RATE OF AROUND 75 PER CENT

The final descent D-Day

troops and the 4th Infantry Division to capture the important port of Cherbourg, at the northern tip of the Cotentin peninsula.

Eisenhower appreciated Leigh-Mallory's anxiety, particularly for the 82nd Division, whose three regiments would drop 20 miles inland, but eventually he came down on the side of Bradley. It was an operation fraught with risk, certainly, but a risk worth taking.

Outwitting Hitler

From the outset, the planning for D-Day – particularly the organisation of the army and air forces – presented a challenge for SHAEF. This was made trickier by the fact that the HQ of the Allied Tactical Air Forces was based in Uxbridge, some 75 miles north of the HQ of the Naval and Army Group in Portsmouth. Aware of the “complicated machinery in major amphibious operations”, General Bernard Montgomery, commander of all Allied ground forces, installed some of his own staff at Uxbridge, making it clear that, as much as he respected the air forces, the Army Group was in charge.

To this effect it was necessary to lay down the law to Air Marshal Sir Arthur Harris, head of Bomber Command, in the spring of 1944. Ordered to launch an intensive bombing campaign of enemy airfields and road and rail links in northern France, Harris made plain his displeasure at diverting his bombers from raiding German cities.

“It caused a good deal of difficulties at a high level,” recalled Goronwy Rees, a member of Montgomery’s staff. Rees had been an observer at the costly raid on Dieppe in August 1942: an abject failure, but one that had taught the Allies the importance of disrupting enemy communications prior to



THE BOMBING CAMPAIGN WAS CUNNINGLY EXECUTED SO AS TO CONCEAL FROM THE NAZIS THE INTENDED INVASION ZONE

an amphibious landing. “Harris had to be persuaded to use his heavy bombers to attack the German road and rail communication,” said Rees, “and I think he resisted very strongly because he thought it was a diversion from whole point of war. But he was made to do it, and it was done enormously effectively.”

The bombing campaign was cunningly executed so as to conceal from the Nazis the true invasion zone. “Our air action prior to D-Day was carefully controlled in order to indicate the Pas de Calais as the intended area of assault,” explained Montgomery in his memoirs. Adolf Hitler was convinced the Allies would launch the invasion across the shortest stretch of the Channel, between Calais and Dover, and to bolster his belief, the RAF dropped twice as many bombs on

TIMELINE The assault from the air on D-Day

00.15am US Pathfinders parachute into Normandy in an attempt to mark out six DZs (drop zones). An hour later, 6,600 men of the 101st Airborne and 6,400 men of the 82nd jump from 882 planes into the western flank of the Allies' invasion zone.	00.16am On the eastern flank of the invasion zone, 181 men from the Oxford & Bucks Light Infantry arrive in six gliders. After a brief fight, they seize the bridges over the Caen canal and Orne river. Their orders are to hold them until troops arrive from the landing beaches.	00.20am Sixty pathfinders mark three DZs for the 6th British Airborne Division, who start parachuting half an hour later. Over 4,250 soldiers land at Ranville, Merville, Touffréville and Troarn, whose tasks include destroying the Merville battery overlooking the landing beaches.	1.15am The RAF launches operations Glimmer and Taxable by dropping strips of foil that appear on radar screens as naval convoys. This is designed to fool the Germans into believing the invasion fleet is heading to Calais, as predicted by Hitler.	3.35am A fleet of 69 Horsa gliders lands at Ranville to reinforce the 6th British Airborne Division. Engineers from the 521st Parachute Squadron have already removed scores of anti-glider poles in the ground, nicknamed 'Rommel's asparagus'.	4am American gliders descend over the Cotentin peninsula as part of operations Chicago and Detroit. Chicago comprises 52 CG-4 Waco gliders containing anti-tank guns and support troops for the 101st, while the 52 gliders of Detroit are allocated to the 82nd Division.
--	---	--	--	--	---



British 6th Airborne
Division pathfinders
synchronise their watches
before take-off near Oxford

Pas de Calais as they did on Normandy.

While the RAF softened up the German defences from the air, the airborne troops trained for an enigmatic operation, of which the location remained a mystery. There were clues, of course, such as the two bridges at Slapton Sands, Devon, that were regularly attacked by the 101st Airborne Division, and a bridge across the Thames at Lechlade, Gloucestershire, that was the target for D Company of the 2nd Oxfordshire and Buckinghamshire Light Infantry, which was part of the British 6th Airborne Division.

Only when D Company moved into their sealed camp in May 1944 did their commanding officer, Major John Howard, reveal their targets: the Bénouville bridge over the Caen canal, and the Ranville bridge over the Orne river to the east of the invasion zone. They were to seize the bridges and hold them until troops arrived from the beaches.

Guiding the way

On 5 June, with the invasion now scheduled for the following day due to poor weather, the American airborne troops began marching to their airfields as the band of the 101st struck up 'A Hell of a Way to Die'. Dozens of unit commanders addressed their men, gearing them up for the daunting task that lay ahead. "We're the best!" yelled Colonel Howard Johnson to the 101st Airborne Division. "What we do tonight and tomorrow will be written in history!"

IWM B 5288/GETTY IMAGES

The pep talk that Colonel Charles Young, commander of the 439th Troop Carrier Group, gave to his pilots was more measured. "The main thing we're interested in tonight, even above our own safety... is to put a closed-up, intact formation over our

Crucial crossing

Allied troops patrol the famous 'Pegasus' bridge over the Caen canal, three days after seizing it on 6 June



assigned drop zone [DZ] at the proper time, so these paratroopers of ours can get on the ground in the best possible fighting condition," he emphasised to his pilots, many of whom had never before been under fire. "Each pilot among you is charged with the direct responsibility of delivering his troops to the assigned DZ. Their work is only beginning when you push down that switch for the green light. Remember that."

The first paratroopers into France on

6 June were the American Pathfinders, the men tasked with establishing the DZs for the main assault force using fluorescent panels and radar beacons. Captain Frank Lillyman was the first of his 120-strong unit to jump over a 50-mile square area of the Cotentin peninsula at 15 minutes past midnight.

Meanwhile, 50 miles east of the Americans, 60 British pathfinders from the 22nd Independent Parachute Company landed and began to mark three DZs in readiness

5am

The RAF begins bombing German coastal defences, and at 5.50am, **American B-26s of the 9th Air Force join the attack**, unleashing 4,400 113-kilogram bombs, while 480 B-24 bombers drop 1,285 tonnes of bombs between Port-en-Bessin and the Pointe de la Percée.

8am

Two Luftwaffe fighter pilots take-off from Lille and **strafe British forces landing on Sword beach**. It is the first of around 100 sorties flown by the Luftwaffe on a day when the Allies' aerial dominance helps establish the beachhead.



8.51pm

Operation Mallard sees 246 gliders arrive in two landing zones north-east of Caen, with 30 light tanks among the cargo for the 6th British Airborne Division. Supplies are also dropped by parachute as **the British prepare for a German counterattack**.

Josef Priller was one of two Luftwaffe pilots to strafe arrivals on Sword beach

8.53pm

Operation Keokuk relieves pressure on the 101st Airborne, which is **engaged in fierce fighting inland from the landing beaches near the peninsula**. Thirty-two Horsa gliders of the 434th Troop Carrier Group land north of Hiesville with medics, jeeps and artillery guns.

9pm

Operation Elmira brings vital reinforcements and resupplies to the soldiers of the 82nd Airborne Division. In two landings, **176 gliders disgorge 418 troops, 67 vehicles, 13 anti-tank guns and 24 tonnes of supplies**. Twenty-six glider crew are killed.

10.30pm

Allied bombers have attacked Caen (pictured below) throughout the day, and in their final evening raid, they cause heavy damage to the port district. The assaults have also killed hundreds of civilians, with bombs intended to destroy bridges falling wide of their target.



The final descent D-Day

Soaring high

A British bomber tows a GAL 49 Hamilcar glider through the skies during preparations for D-Day



Vital intelligence

A May 1944 photograph of the Merville battery, which threatened troops arriving on Sword beach

Thumbs up

Men of the British 6th Airborne Division get ready to drop over the eastern flank of the invasion zone



Fatal crash

Eight US troops lie dead in a Normandy field beside the wreckage of their Horsa glider. Largely constructed from wood and fabric, gliders risked breaking apart when landing at such high speeds



for the arrival of 4,255 soldiers from the 6th Airborne Division, who were jumping over Ranville, Merville, Touffréville and Troarn.

Lillyman had been the first Allied soldier to set foot in France on 6 June, but a minute later Major John Howard and his 180 men glided to earth. Howard's glider was the first to land. "We had to link arms to prevent us from being thrown around inside the glider, and to lift our feet up before landing as it could take your legs off landing at 90mph," recalled Lance Sergeant Tich Raynor.

It was a perfect landing, just 30 yards from the Bénouville bridge over the Caen canal, and Lieutenant Den Brotheridge led his platoon out of the glider and towards the target. Private Billy Gray aimed his Bren gun "at a German on the right-hand side and let rip at him, and down he went". Brotheridge was killed as he ran onto the bridge – the first Allied fatality of D-Day – but the two bridges (later renamed 'Pegasus Bridge' and 'Horsa Bridge') were soon in British hands.

A hostile reception

The first of the 882 aircraft that comprised the American Airborne invasion force reached the DZs at 1.15am. They had flown south-west over the English Channel at 500 feet to avoid enemy radar detection and then turned left on a radio signal from a Royal Navy marker vessel.

Roughly 10 miles separated the DZs of the 6,600 men of the 101st Division and the 6,400 soldiers of the 82nd. The 101st came in first and, even though they were caught by surprise, the German anti-aircraft defences were soon in action. Several planes were hit, including the C-47 piloted by Second Lieutenant Marvin Muir of the 93rd Troop Carrier Squadron. Flames engulfed the aircraft, but Muir remained at the controls so that the paratroopers were able to jump onto the DZ. "The devotion to duty, heroism, and service above self displayed by Lieutenant Muir on this occasion reflect great credit upon himself and the Armed Forces of the United States," stated the citation for his posthumous Distinguished Service Cross.

Once they had jumped, the paratroopers floated to earth in fear. "A moment of terror seized me," recalled Burt Christenson of the 101st. "Seventy feet below and 20 feet to my left, a German quad-mounted 20mm anti-aircraft gun [was] firing on the C-47s passing overhead." Christenson landed 40 yards away from the gun. He cut himself out of his chute, pulled out his revolver and crouched behind an apple tree. But the Germans hadn't seen him, and he melted into the darkness to search for his buddies.

Many of the American pathfinders had

WE HAD TO LINK ARMS TO PREVENT US FROM BEING THROWN AROUND INSIDE THE GLIDER, AND LIFT OUR FEET UP; IT COULD TAKE YOUR LEGS OFF LANDING AT 90MPH

been unable to illuminate their DZs because of low-hanging cloud banks. This, combined with heavy anti-aircraft fire and inexperienced aircrews, caused a wide dispersal of the airborne troops. Only one regiment, the 505th of the 82nd, fell accurately, and of the 6,600 men of the 101st Division only 1,100 landed near their objective; in total 60 per cent of equipment was lost.

The difficulties experienced by the pilots in the air lift was evident in the report of the 313th Troop Carrier Group. "Attempted to follow prescribed route, but was unable to do so because of weather," it ran. "Weather caused group formation to break up completely, and aircraft then proceeded individually to Drop Zone... from sandbar to DZ, snipers shot at aircraft. What appeared to be 40mm AA fire encountered from Sainte-Mère-Église and from west of DZ. Machine gun and small arms fire encountered from all around area of DZ. Concentrated 20mm fire from Carentan."

Also widely dispersed was the 9th Parachute Battalion of the British 6th Airborne Division. Their commanding officer, Lieutenant Colonel Terence Otway, managed to locate only 150 of his 600 men. Displaying great courage, however, they still accomplished their objective: seizing the Merville battery that overlooked the Anglo-Canadian landing beaches.

Some of the aircraft that took off from England bound for the French coast contained neither bombs nor soldiers. To fool the Germans into believing the invasion force was heading to the Calais region, No 617 and No 218 squadrons dropped strips of tin foil known as 'chaff' in order to confuse German radar signals, while a fleet of Royal Navy motor launches buzzed the coast.

Other aircraft dropped hundreds of dummy parachutists south-west of Caen and in the Cotentin peninsula to draw German

defenders away from the real paratroopers floating to earth. Nicknamed 'Ruperts', the dummies were, in the words of an army memorandum, "a model man made of sandbags, [approximately] one third the size of a normal man. Parachute to same scale." Attached to the dummies were simulators fitted with timing delays that were triggered upon leaving the aircraft. Once the sandbag hit French soil the simulators exploded, replicating the noise of machine gun fire.

Jumping with the 'Ruperts' in the Cotentin peninsula were six men of the Special Air Service, tasked with detonating a series of bombs to add to the illusion of a large-scale landing. "At approximately 3am the party laid their Lewes bombs (20 of them) in an area of 500 square yards and ignited them," recalled Trooper Hurst. "By this time it was getting light, so refuge was taken in a hedge about half a mile north of the area."

The longest day

Dawn fully arrived at 6am on 6 June. An hour earlier the RAF had begun bombing German coastal defences (in all 1,136 aircraft dropped 6,000 tonnes of bombs). Meanwhile, the US Air Force targeted the area between Port-en-Bessin and the Pointe de la Percée, where 480 B-24 bombers unleashed 1,285 tonnes of explosives.

When the main invasion got underway (from 6.30am for the Americans on Utah and Omaha beaches, and from 7.25am for the British and Canadians on Gold, Sword and Juno beaches), the Allies were in control of the sky. Field Marshal Hugo Sperrle, German commander of Luftflotte 3, had only 198 bombers and 125 fighters, while the Allies had at their disposal 8,876 bombers and 5,409 fighters.

A day that had begun with Captain Lillyman jumping into the dark Normandy night concluded with the successful insertion at 9pm of hundreds of Allied gliders, bringing with them reinforcements and fresh supplies for the British 6th Airborne positions on the eastern flank, and the American 101st and 82nd in the west.

It had been a day of bitter fighting for the American Airborne, and casualties had been high. In total, 1,259 men of the 82nd Division were killed, wounded or missing, and for the 101st the figure was 1,240. But they had secured most of their objectives, and by nightfall on 6 June the 4th Infantry Division had advanced four miles inland from Utah beach. Eisenhower's risk had paid off. ■

Gavin Mortimer is a historian and author. His books include *The Men Who Made the SAS* (Constable, 2015) and *Guidance from the Greatest* (Constable, 2020)

In 1944, as the war in the west entered its final throes, the Nazis unleashed a barrage of flying bombs and rockets on London in a last-ditch attempt to break British morale. **Joe Maiolo** tells the story behind the German V weapons programme – and the Allied plans to thwart it

HITLER'S SECRET WEAPON

Covert operation

An aerial view of the V2 rocket experimental area at Peenemünde in June 1943. (A) shows two V2 rockets on their sides; (B) indicates where the rockets were stored; while (C) shows an assembly shop



Londoners would never forget the sound of Hitler's revenge. First came that hideous burping noise of the approaching pulsejet; then the nerve-racking silence after the motor cut out and the robot plane dived to earth; and finally, the ear-shattering explosion.

The noise of a V1 flying bomb was haunting, but what was worse was the deadly silence of the V2 ballistic rocket. Plunging to earth at almost four times the speed of sound, you did not know about the attack until you heard the warhead detonate – unless, of course, you happened to be too close to the point of impact, in which case you never heard anything at all.

Germany's propaganda minister, Joseph Goebbels, dubbed the V1s and V2s the *Vergeltungswaffen*, or retaliation weapons. From June 1944 to March 1945, the V weapons tormented Londoners and caused untold misery. Some 2,419 V1 flying bombs reached the city, claiming 6,184 lives

and injuring 18,000. And 517 V2 rockets hit London, killing 2,700 people and wounding over 6,500 more. Although London was the main British target for the V weapons, other cities, including Portsmouth, Manchester and Norwich, were also hit.

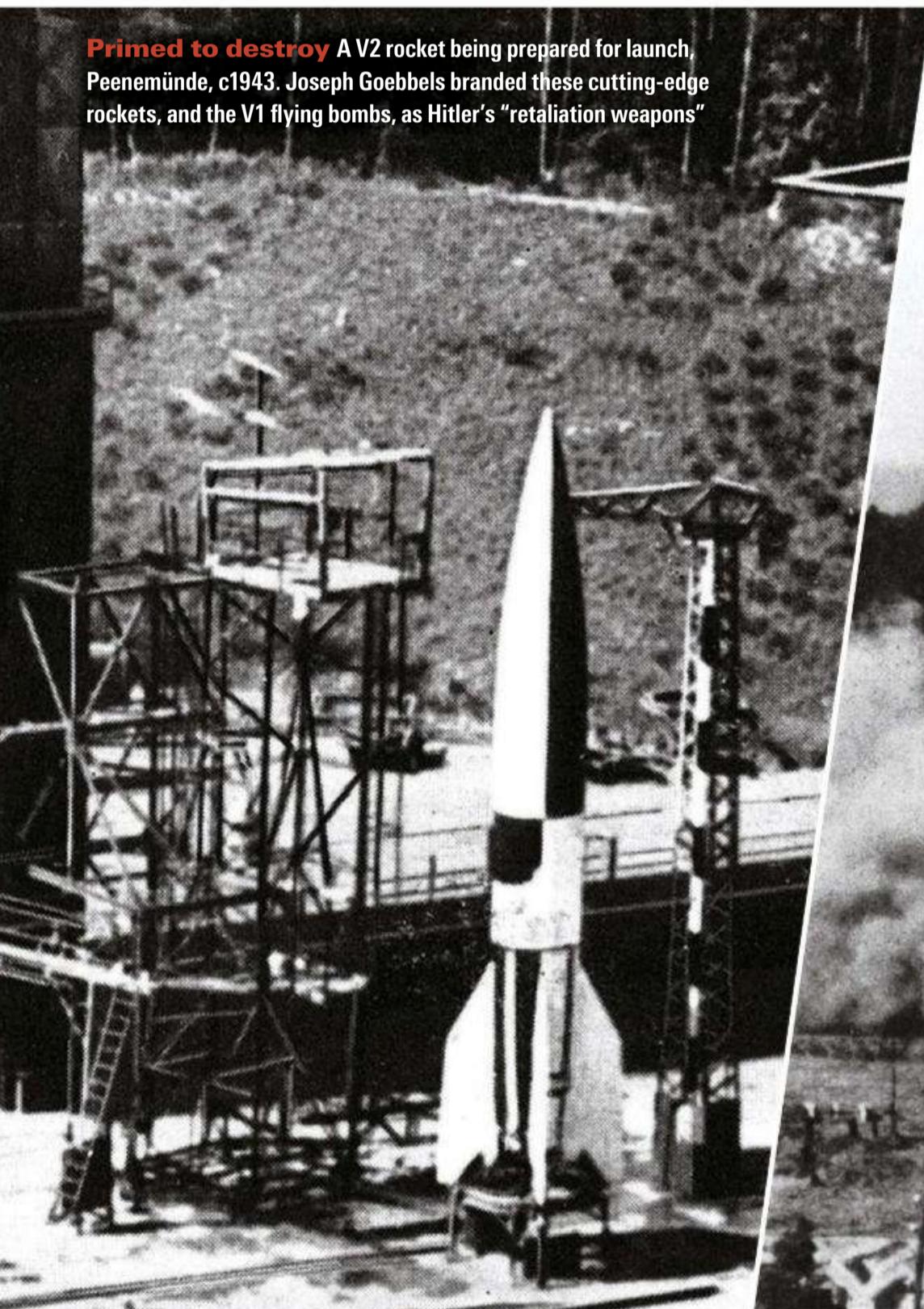
Apart from the cost in lives and injuries, the V weapons struck at British morale in the final stages of the war. While Allied forces squeezed the life out of the Reich from east and west, Londoners started to feel that victory belonged to them. Then, from out of the blue, came Hitler's high-tech revenge.

The German army had first started experimenting with small rockets in the early 1930s, and large-scale research and development began in 1936. The strategy of using mass attacks with big rockets to win wars first piqued Hitler's interest in August 1941. The German army showed him a film of early tests conducted by their top rocket engineer, Wernher von Braun. Impressed by the footage and von Braun's presentation, Hitler declared the rocket a "revolutionary

HITLER DID NOT WANT SMALL PINPRICK ATTACKS... INSTEAD HE WANTED SURPRISE ATTACKS OF THOUSANDS OF ROCKETS

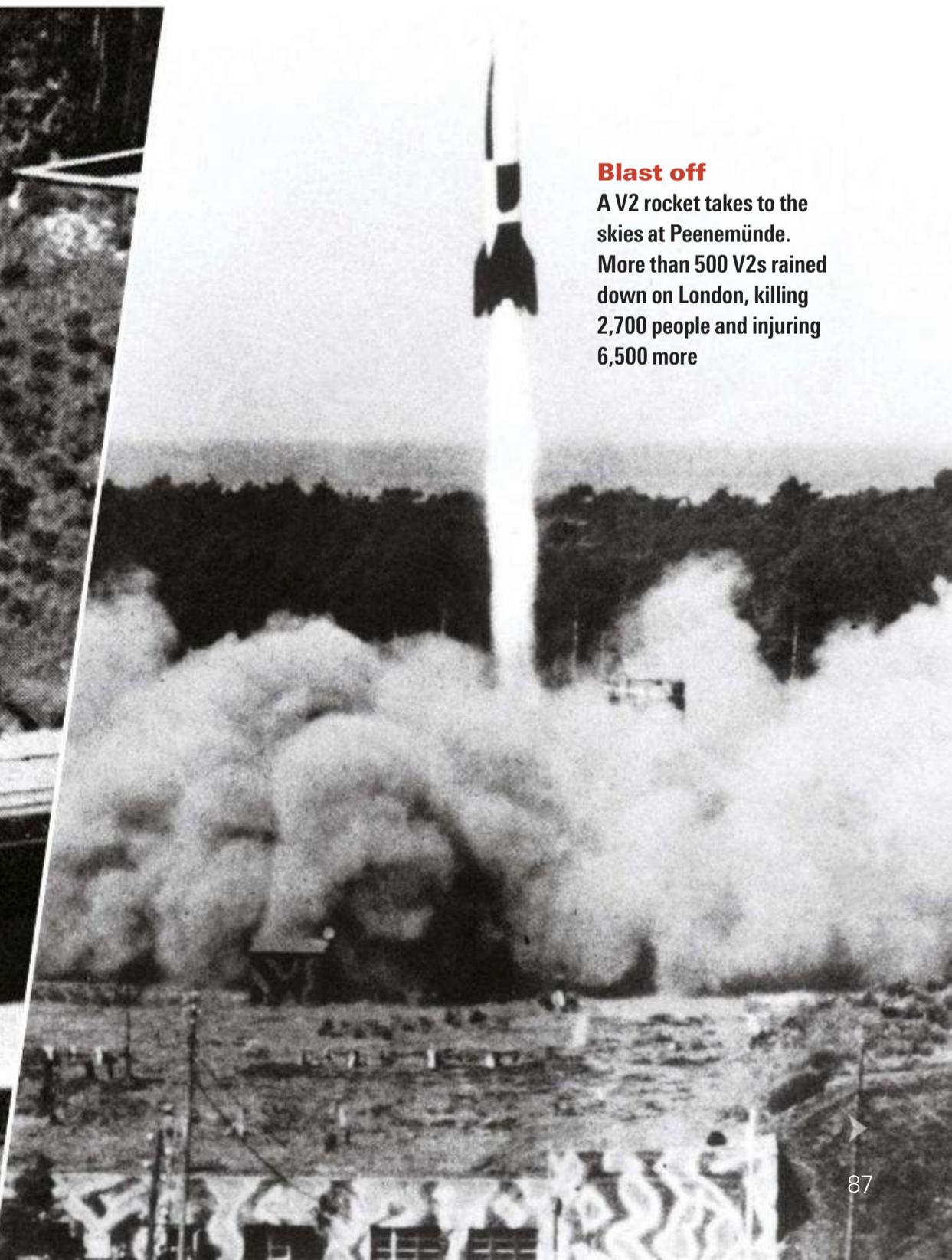
development" in the conduct of warfare. He told the army chiefs that he did not want to waste the technological breakthrough in small pinprick attacks, but instead he wanted to defeat his foes with surprise attacks of thousands of rockets. However, setbacks to the army's development

Primed to destroy A V2 rocket being prepared for launch, Peenemünde, c1943. Joseph Goebbels branded these cutting-edge rockets, and the V1 flying bombs, as Hitler's "retaliation weapons"



Blast off

A V2 rocket takes to the skies at Peenemünde. More than 500 V2s rained down on London, killing 2,700 people and injuring 6,500 more



A DANGEROUS PAIR

The V1 and V2 were pioneering pieces of technology that packed deadly punches

During the Second World War, German scientists and engineers made extraordinary advances in jet propulsion and rocketry that produced two new long-range bombardment systems: the V1 flying bomb and the V2 rocket. They were first used against London in the summer of 1944 in what the British called Hitler's V weapons campaign – the V stood for vengeance.

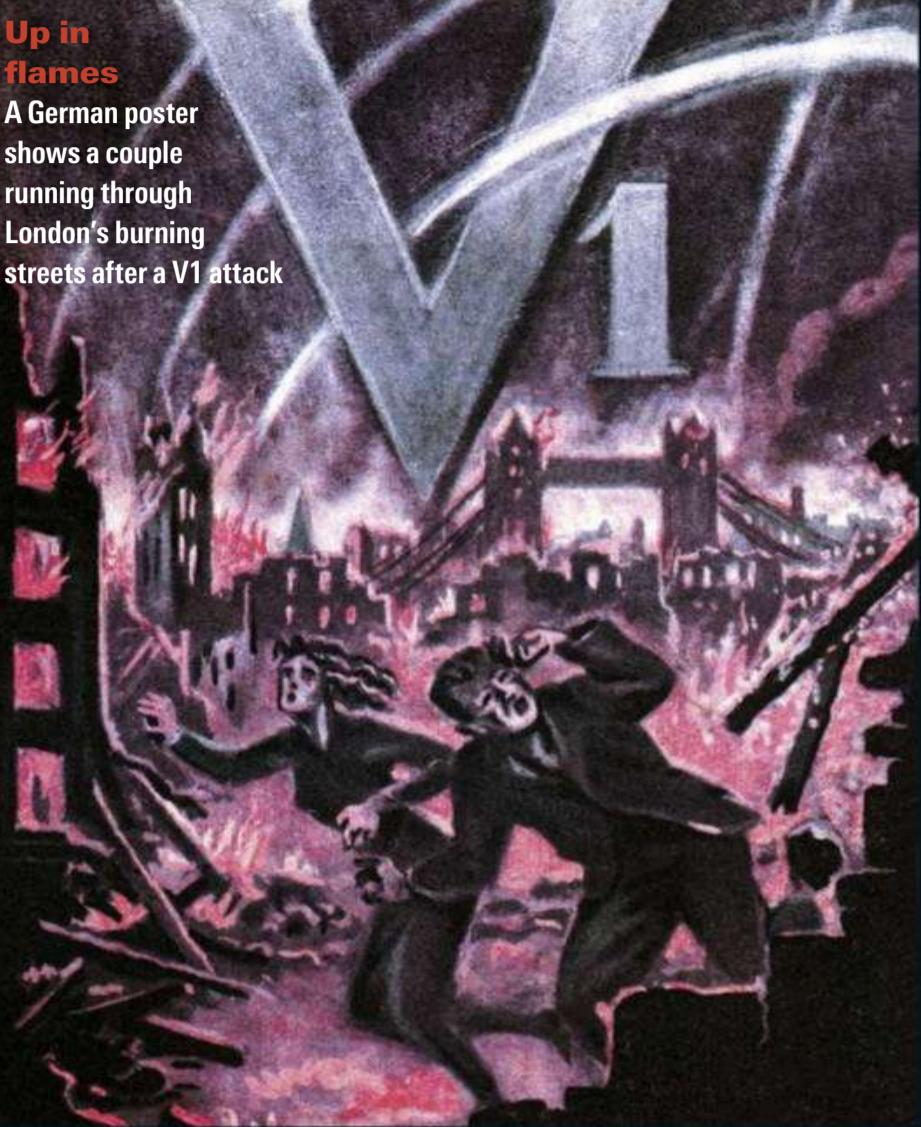
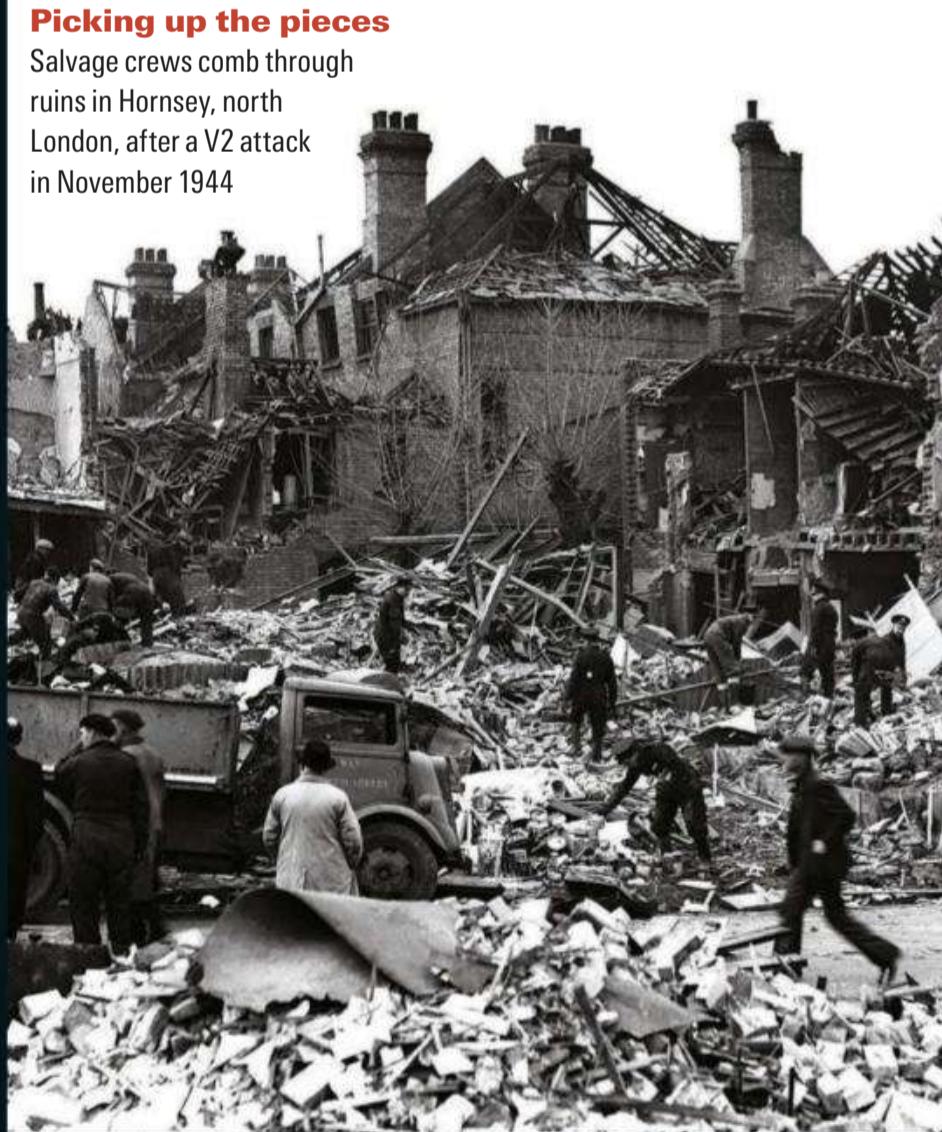
The V1 was a 25-foot-long pilotless airplane with a wingspan of 18 feet and was armed with a one-tonne warhead. It was powered by a pulsejet motor to a speed of 360mph and a range of 155 miles. The V1 could be ground-launched from a ramp with a catapult or, much less often, air-launched from a bomber. Once airborne, the V1's

heading was maintained by a mechanical autopilot with a compass and gyroscope. Once over the target area, a small propeller fuse would shut down the pulsejet, and the flying bomb would fall to earth.

The V2 was a 46-foot-long liquid-fuel rocket that weighed 12 tonnes. Mobile units fired the rockets from concrete launch pads. At launch the V2 would climb to a height of up to 100,000 feet and then lean towards its target. The rocket engine subsequently shut down once the V2 achieved a pre-set velocity. It would then free fall along a ballistic trajectory to its target. The blast from the rocket crashing into the ground at supersonic speed augmented the destructive power of its one-tonne warhead.

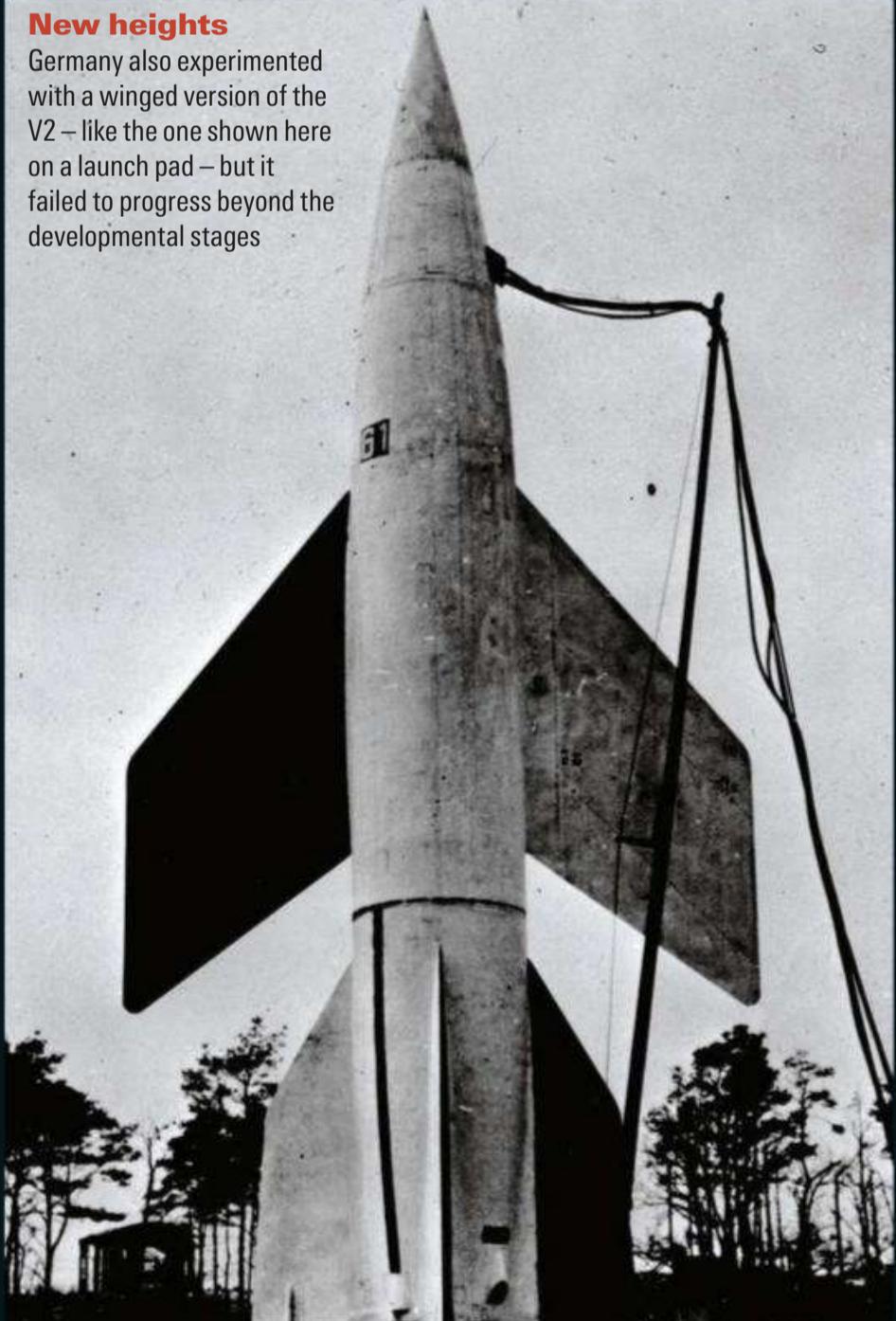
Picking up the pieces

Salvage crews comb through ruins in Hornsey, north London, after a V2 attack in November 1944



New heights

Germany also experimented with a winged version of the V2 – like the one shown here on a launch pad – but it failed to progress beyond the developmental stages



programme and more urgent demands on the Third Reich's limited industrial and scientific resources delayed the move to full-scale production until March 1943.

The army's head of rocketry believed he could force Britain out of the war by raining 900 V2s down on London every month for a five-month period. Not to be outdone by the army in the race to win the war for Hitler, though, the Luftwaffe built a rival weapon: a jet-propelled flying bomb. This had an edge over the rocket as it was much cheaper and easier to build. The Luftwaffe believed it could knock Britain out by hitting London with 1,500 flying bombs in only 10 days. Both weapons received Hitler's backing, and by the summer of 1944, Germany had two long-range bombardment systems primed for an all-out attack on the British capital.

Heightened anxieties

Despite German efforts to conceal V weapons, secret intelligence revealed their existence to the British long before the first one struck London. Rumours about rockets reached London in 1939 and again in 1942. However, the breakthrough came in March 1943, when two captured German generals mentioned heavy rockets in a conversation secretly recorded by British intelligence. Not long after that, the British tricked a third captured German general into revealing the secret when they allowed him to obtain a specially printed one-off copy of the *Daily Herald* that reported false news from Sweden about German rockets.

From then on, the British were deeply anxious about the threat of a rocket attack. Early forecasts of the damage from a sustained rocket strike on London presented the government with the terrifying prospect of tens of thousands killed and many more wounded, as well as the full-scale evacuation of London. In response, the British chiefs of staff ordered that the intelligence effort, including photographic reconnaissance flights over the suspected German rocket research establishment at Peenemünde on the Baltic coast, should be stepped up. Prime Minister Winston Churchill appointed his son-in-law, Duncan Sandys, who was the permanent secretary to the Ministry of Supply, to head an investigation into the threat and to recommend any countermeasures that should be taken.

Sandys' inquiry prompted a heated debate among the government's top scientific advisors. RV Jones, a senior scientific intelligence official at the air ministry, considered the threat to be very real. However, Churchill's chief scientific



BOTH WEAPONS RECEIVED HITLER'S BACKING... GERMANY WAS PRIMED FOR AN ALL-OUT ATTACK ON THE BRITISH CAPITAL

advisor, Lord Cherwell (Professor Frederick Lindemann), was certain that the incoming intelligence about long-range rockets was nothing more than a German deception to conceal some other secret weapon.

The debate revolved around a technical issue. Lord Cherwell argued that a big rocket propelled by the burning of cordite would need to contain the combustion in a body of steel, making it too heavy to take off. Other scientists, including Jones, countered that a rocket that burned liquid fuel could be built light enough to make it a practical weapon.

As in so many intelligence disputes, both sides had a point. Cherwell doubted that the Germans would invest scarce scientific and industrial resources in long-range rocketry to deliver a relatively small explosive payload when fleets of bombers, or flying bombs, could do the job cheaply and efficiently.

Yet his critics were also right. Cherwell had underestimated the German scientists' ability to solve the immense technical difficulties of propelling a rocket by burning alcohol and liquid oxygen, because that was precisely what Wernher von Braun and his ingenious colleagues at Peenemünde were doing in 1942–43.

Unpacking the puzzle

Meanwhile, the British intelligence machine searched for fresh evidence. Jones found persuasive clues from decoded German military radio traffic ('Ultra' intelligence), such as the deployment of radar units near Peenemünde, which he correctly assumed were there to track flight tests. Aerial photographs of Peenemünde taken by fast Mosquito aircraft showed the station was being expanded, but nothing conclusive arrived until 23 June 1943. The analysis of photos taken of Peenemünde that day by the Royal Air Force's photographic intelligence unit at Medmenham clearly showed rockets.

Over the next six months the evidence mounted. Photo-reconnaissance found a facility near Calais that a French secret agent claimed was a rocket site. Meanwhile, photo-reconnaissance of northern France revealed the Germans were building dozens of odd-looking, ski ramp-like structures that were alarmingly pointing toward London. In November 1943, Flight Officer Constance Babington-Smith, a brilliant photo interpreter at RAF Medmenham, spotted a peculiar small plane on a ski ramp at Peenemünde that further study confirmed to be a flying bomb.

This development added urgency to Operation Crossbow, the campaign against the V weapons. The Sandys inquiry suggested implementing defensive measures,

Deadly innovations
ABOVE The V1 flying bomb, which claimed the lives of more than 6,000 Londoners
BELOW V2 inventor Wernher von Braun (in suit) attends a missile launch in May 1943



The final descent V weapons

including preparations to evacuate London, the construction of additional shelters, plans to warn the press and to control the news to prevent panic, and some inventive ways to deceive the Germans about the accuracy of their aim once the attacks began.

Anxious that the rockets might be used to disrupt D-Day, or that they would take such a horrific toll on Londoners that the invading Anglo-American armies would be forced to divert their operations to the capture of the launch ramps, the government also considered offensive action. If the bombardment became intolerable, Churchill suggested retaliating with poison gas. His military chiefs, however, advised against the diversion of strategic bombers from the systematic destruction of the German war economy to a mere reprisal. Even so, the British decided to attack known production and launch sites to suppress the V weapons.

On the night of 17–18 August, RAF Bomber Command sent 596 aircraft to attack Peenemünde in a daring precision raid with 4,000-pound blockbuster bombs. In December 1943, Anglo-American strategic and tactical air forces also began a campaign against the V1 launch sites that in its first phase flattened nearly all of them.

By the summer of 1944, Operation Crossbow became a race between Allied efforts to locate and bomb V1 launch sites, and German efforts to rebuild them and to find ever more clever ways to hide them. That cat and mouse game, which the Germans began to win, continued until the autumn of 1944, by which time the Anglo-American armies had overrun all of the V1 launch ramps.

Delusions of grandeur

Although senior air force commanders complained about the diversion of bombers to an increasingly ineffective campaign against the V1s, the bombing certainly helped to reduce the frequency of the launches. The first phase of Operation Crossbow and the Peenemünde raid – which forced the Germans to relocate their rocket scientists and to assemble the V2s in underground tunnels – also helped delay the start of the attacks by several crucial months.

Yet, even if Operation Crossbow had been less successful, it is doubtful that the intensity of V attacks would have threatened the Allied war effort. After all, Hitler wanted more than revenge from his secret weapons: he wanted to knock Britain out of the war. To achieve that goal, his planners estimated that they needed to pummel London with thousands of V1s and V2s a day, but the actual strike rate could never exceed a few dozen. This was in part due to mechanical



Hide and seek Allied soldiers uncover a V1 launch ramp near Zutphen, Netherlands, September 1944. The Allies were caught up in a dangerous game of cat and mouse while trying to locate the camouflaged sites

failures and British air defences. But the root cause was a lack of industrial capacity to mount the sort of massive surprise attack that Hitler had imagined in August 1941.

Ultimately, Lord Cherwell was right. A rocket was a very expensive way to deliver a one-tonne bomb. The V weapon only delivered 0.23 per cent of the total explosives dropped on the Reich by the Allied bomber forces. And from this perspective, the German V weapons programme takes on an air of desperation. It was no coincidence that Hitler ordered the V2 into mass production just after the debacle at Stalingrad. Rockets and flying bombs were the products of an expiring German military-industrial complex. They served no purpose other than feeding Hitler's illusion that the war could be won.

That the Allies won through vastly superior industrial and military resources, however, does not diminish Operation Crossbow's success. Early warning gave the British time to adjust to the new threat. Air superiority gave them a tool with which they could suppress it.

In February 1944, only eight months after photographic intelligence had discovered the V2s, Churchill said he felt "much easier" about the rockets. Hitler "would certainly try the weapon", but thanks to good intelligence and air power, Churchill told his top advisors, we should not become "the slave of our fears".

Joe Maiolo is professor of international history at King's College London. His books include *Cry Havoc: The Arms Race and the Second World War, 1931–41* (John Murray, 2010)

THE V WEAPONS PROGRAMME TOOK ON AN AIR OF DESPERATION... IT SERVED NO PURPOSE OTHER THAN FEEDING HITLER'S ILLUSION THAT THE WAR COULD BE WON

A DISASTER IN THE PLANNING



GETTY IMAGES

Wrecked hopes The remains of an Allied glider that participated in Market Garden. The abject failure of the operation led to heavy Allied casualties and vicious Nazi reprisals against the local civilian population. Antony Beevor describes it as "a perfect example of how not to plan an airborne operation"

Market Garden, the ill-fated Allied operation to break through the German defences in the Netherlands in September 1944, is often portrayed as a risky yet worthy gamble. In truth, argues **Antony Beevor**, it was a flawed idea from the start, more driven by ego than by any practical considerations

There are many myths about the battle for Arnhem and Operation Market Garden. Historians of the battle have often been tempted into the 'if only' trap. If only this, or if only that, had been different, then it would all have turned out to be a brilliant success. This cherry-picking of faults is a grave distraction from the harsh fact that Market Garden was a perfect example of how not to plan an airborne operation.

Market Garden was one of the greatest Allied disasters of the Second World War – immortalised in the 1977 film *A Bridge Too Far*. The plan was for Allied paratroopers and land forces to launch a staggering combined attack, which would break through German defences in the Netherlands. Beginning on 17 September 1944, it ended in failure just a week later, resulting in thousands of casualties. The British airborne troops who spearheaded the assault suffered particularly badly in their doomed attempt to capture the bridge in the Dutch town of Arnhem.

A month earlier, the mood among the Allies had been very different, as their forces routed the Germans in the concluding phases of the battle of Normandy. As they advanced towards the Reich, the Allied commanders now had to decide on the next step to take. It was here that the disastrous plan was born.

At the heart of the failure in preparation lay the grand ambitions of Field Marshal Bernard Montgomery, who had commanded the Allied ground forces in Normandy. He wanted to seize control of Allied strategy by being first across the Rhine so that General Dwight D Eisenhower, supreme commander of Allied Expeditionary Forces in Europe, would have to give him full priority in supplies and command over American formations. The prospect of 'jumping the Rhine' with an airborne operation leading all the way to the bridge at Arnhem, the northern route into Germany, would force the 1st US Army to support Montgomery on his right flank.

To do this, Montgomery needed the 1st Allied Airborne Army, formed on 2 August 1944 on the order of Eisenhower, who thought a single agency was required to coordinate airborne and troop carrier units. Despite Eisenhower's devotion to balanced Allied relations, its leadership was lopsided. US general Lewis Brereton's staff consisted mainly of US air force officers. The only senior British officer was Brereton's deputy, Lieutenant General Frederick Browning. Matters were not helped by a strong mutual



The chief and the cheerleader

Eisenhower, the man in charge of Allied forces in Europe, found the opinionated hero of El Alamein, Montgomery, difficult to work with. Eisenhower even considered sacking Monty after Operation Goodwood, part of the Normandy campaign, but feared a backlash in Britain

dislike between Brereton and 'Boy' Browning. The only characteristic the two men shared was vanity.

Browning, a hawk-faced Grenadier Guards officer with the air of a matinée idol, was married to the author Daphne du Maurier. Although brave, Browning was highly strung. He was desperate to command an airborne corps in action. His barely concealed ambition, combined with a peremptory manner, did not endear him to American paratroop commanders.

On 3 September, Montgomery met General Omar Bradley to discuss an airborne operation in south Belgium across the river Meuse. They agreed to cancel it, as Bradley wanted the troop carrier aircraft to deliver fuel to Patton's 3rd Army. But Montgomery had not been straight with Bradley. He promptly ordered his chief of staff to organise an airborne operation "to secure bridges over [the] Rhine between Wesel and Arnhem". This was to be called Operation Comet, an idea in keeping with Montgomery's ambition to lead the main push into Germany. Needless to say, Bradley was furious when he discovered that Montgomery had tricked him.

Freezing out the air force

'Boy' Browning was far from alone in his desire to use paratroop and glider forces in a decisive way. American generals longed to try out the new airborne army. Churchill also wanted the operation to boost British prestige. And euphoria following the rapid Allied advance from Normandy to Belgium fuelled a mood of optimism.

Unfortunately, Montgomery did not want to consult the RAF over Comet – even though the War Office and Air Ministry had agreed, following airborne chaos in the invasion of Sicily in 1943, that the air force side must lead the planning process. Montgomery even called Air Chief Marshal Leigh-Mallory "a gutless bugger" as he had predicted disaster for the airborne drops that had taken place in the assault on Normandy.

On 9 September 1944, the commander of the Polish Independent Parachute Brigade, Major General Sosabowski, joined Roy Urquhart of the 1st Airborne Division to discuss Comet with Browning. "Sir," said Sosabowski, "I am very sorry, but this mission cannot possibly succeed." It would be suicide with such small forces, he said. Browning took deep offence.

In Belgium, General Dempsey, commanding the 2nd British Army, had just reached similar conclusions to those of Sosabowski. General Horrocks of the British XXX Corps (which would later play a key

MONTGOMERY'S COMPLAINTS WERE HALTED BY EISENHOWER SAYING, "MONTY, YOU CAN'T SPEAK TO ME LIKE THAT"

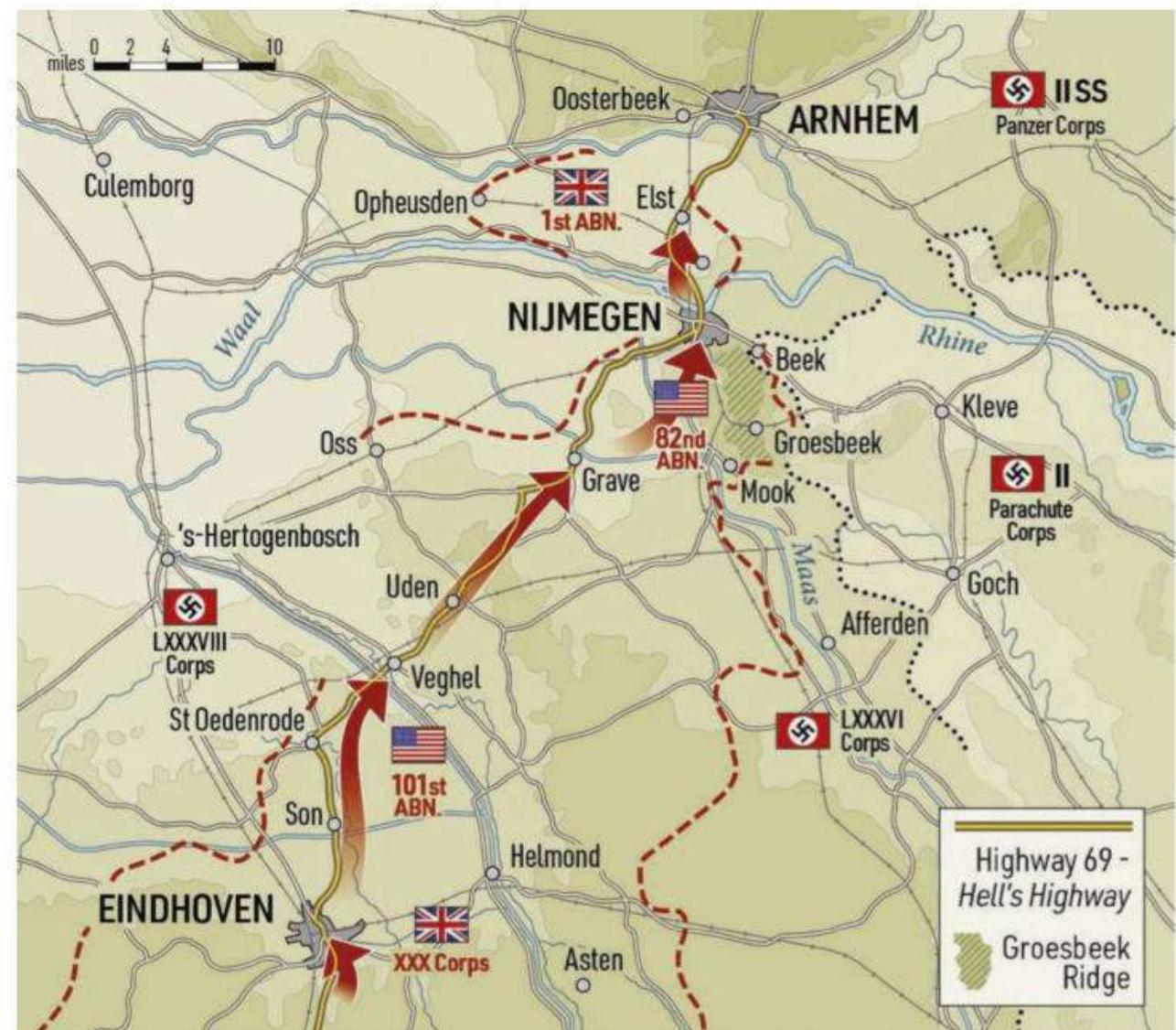
role in Market Garden) had confirmed that a bridgehead over the Albert canal in north-east Belgium was “being strongly opposed by the enemy”.

The next morning, Dempsey went to Montgomery’s headquarters and managed to persuade him that Operation Comet was too weak. They needed at least three airborne divisions. Montgomery liked the idea. It would bring the American 82nd and 101st Airborne Divisions under his command. But to Dempsey’s dismay, Montgomery also brandished a signal at him that had arrived from London. The first V2 rockets had landed in England, having apparently been fired from the area of Rotterdam and Amsterdam. For Montgomery, who wanted to go north via Arnhem (Dempsey preferred to go east), this was just the confirmation he needed to justify his decision.

Dempsey summoned Browning. In just two hours, they put together a plan. Market Garden consisted of two parts. Market was the airborne operation, in which the American 101st and 82nd Airborne Divisions would seize river and canal crossings from Eindhoven to Nijmegen, with the bridges over the rivers Meuse and Waal, the largest in Europe. The British 1st Airborne Division and the Polish brigade would drop near Arnhem to capture the great road bridge over the Lower Rhine. Conversely, Operation Garden would consist principally of Horrocks’s XXX Corps, led by tanks, charging north to meet the airborne troops. They would have to travel up a single road, with flood plains on either side broken only by woods and plantations.

Montgomery now headed for Brussels aerodrome to see Eisenhower. It was the famous meeting when Montgomery’s tirade of complaints was halted by Eisenhower putting his hand on Montgomery’s knee and saying: “Monty, you can’t speak to me like that. I’m your boss.” Eisenhower reminded Montgomery that he had previously given him the support of the 1st Allied Airborne Army, yet this led to no more than a mention of Market Garden. Here, Eisenhower followed standard US Army practice. Having agreed an overall strategy, he did not believe in interfering further.

By the time Montgomery returned to his tactical headquarters, Dempsey had “fixed with [Browning] the outline of the operation”, his diary entry stated. Browning’s excitement was palpable. He sent the code-word ‘New’ from Dempsey’s HQ back to 1st Allied Airborne Army at Sunninghill Park. This signified that a planning conference was to be called that evening. Brereton must have been affronted that Montgomery had made no attempt to consult him in



ABOVE Our map of Operation Market Garden shows how far the Allies intended to penetrate into German-held territory, a plan that left airborne troops vulnerable to counterattack



LEFT The crossing at Arnhem, which the Allies destroyed in the autumn of 1944. Its postwar replacement is called the John Frost Bridge

advance. Eisenhower had ordered that planning should be shared. Montgomery had deliberately ignored this.

Fateful meeting

Twenty-seven senior officers gathered in the Sunninghill Park conference room at 6pm. Astonishingly, neither Urquhart nor Sosabowski had been invited. Browning presented what he and Dempsey had worked out, using an airlift timetable based on an earlier operation. Disingenuously, he implied that it had Eisenhower’s blessing. Brereton and his staff privately dismissed it as just “a tentative skeleton plan”.

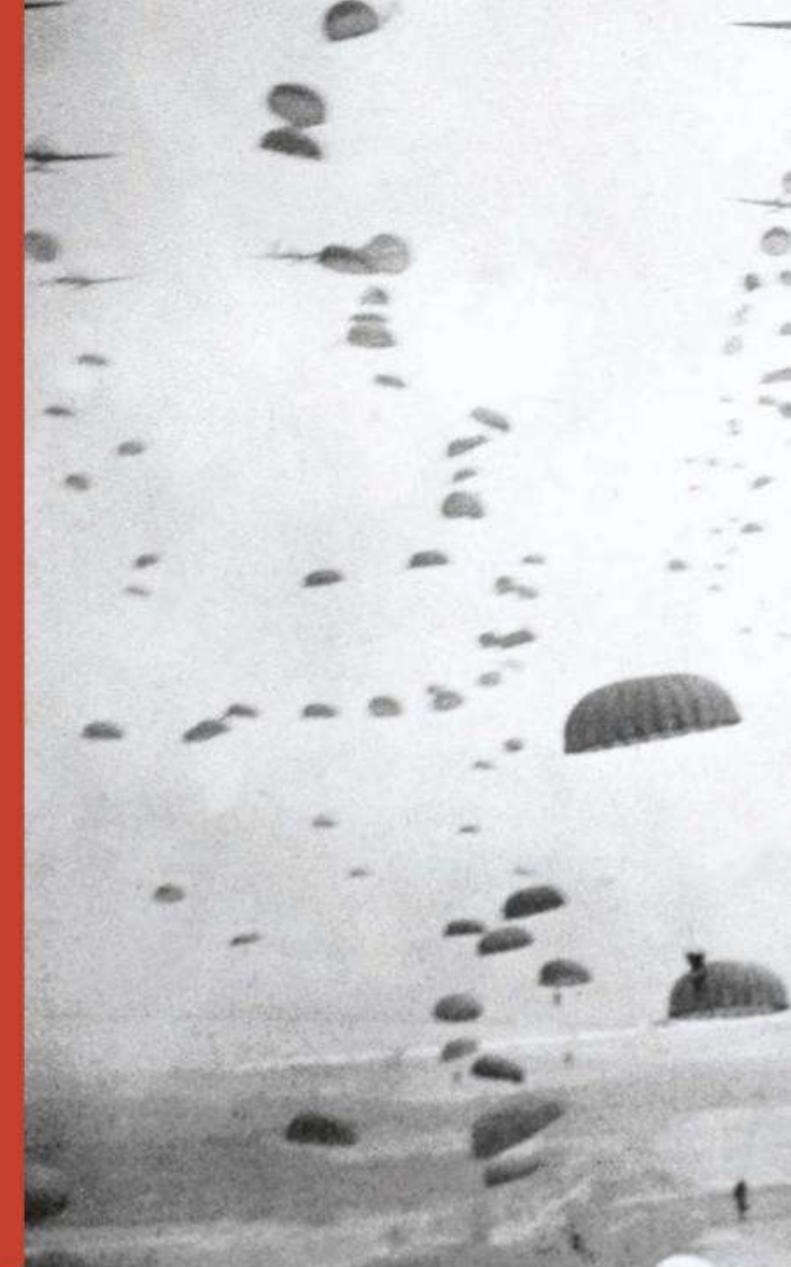
They first of all decided that it was to be

a day operation because “the supporting air forces available could knock out flak positions in advance”. Brereton then asked Major General Williams of IX Troop Carrier Command to speak. His words must have come as a bombshell to Browning. Most of the key assumptions on which he and Dempsey had worked that day were now thrown in the air. “The lift would have to be modified, due to the distance involved, which precluded the use of double tow lift... single tow only could be employed.” This meant only half the number of gliders could be taken on each lift. And since the mid-September days were shorter and the mornings mistier, Williams ruled out two lifts in a day.

The final descent Operation Market Garden



Fighting for freedom Dutch civilians offer assistance to US paratroopers. The Dutch people would suffer terribly in the fall-out from the failure of Operation Market Garden, with thousands dying



These changes signified that it would take up to three days to deliver the airborne divisions, assuming perfect flying weather. No more assault troops would be landing on the crucial first day than with Comet, because half the force would have to be left behind to guard landing and drop zones for later lifts. And the Germans, having identified Allied intentions, would be able to concentrate troops and anti-aircraft batteries against these areas. Williams' obdurate attitude might have contained an element of revenge after Montgomery's refusal to consult the air force side in advance, but Montgomery's determination to impose an ill-considered plan was the real problem.

A poorly conceived idea

At a follow-up meeting, American air force officers more or less dictated the choice of drop and landing zones. Their main priority was to avoid German flak batteries on the way in and out. Major General Williams also rejected the idea of glider-borne coup de main parties (advance assault troops) to seize the main bridges, a key element in Operation Comet.

Troop Carrier Command wanted to stay well away from the key objectives of Arnhem and Nijmegen bridges because of their anti-aircraft defences. At Arnhem, they were also threatened by the Luftwaffe airfield of Deelen, just to the north of the town. As a result, the British division was to be dropped well to the west, with an approach march of between six and eight miles to the road

OPERATION MARKET GARDEN WAS QUITE SIMPLY A VERY BAD PLAN RIGHT FROM THE START AND RIGHT FROM THE TOP

bridge through a major town. Surprise, the most vital element in airborne operations, was therefore lost before they even took off.

Operation Market Garden was quite simply a very bad plan right from the start and right from the top. Every other problem stemmed from that. Montgomery had not shown any interest in the practical problems surrounding airborne operations. He had not taken any time to study the often chaotic experiences of north Africa, Sicily and the drop on the Cotentin peninsula in Normandy. His intelligence chief, Brigadier Bill Williams, also pointed to the way that "Arnhem depended on a study of the ground [which] Monty had not made when he decided on it." In fact, Montgomery obstinately refused to listen to Dutch warnings about the impossibility of deploying XXX Corps off the single raised road onto the marshy flood plain.

Towering over everything was the fact

that the operation depended on everything going right, when it is an unwritten rule of warfare that no plan survives contact with the enemy. This is doubly true of airborne operations. The likelihood of the Germans blowing the road bridge at Nijmegen over the river Waal was barely discussed. Had they done so – and their failure to do so was an uncharacteristic mistake – XXX Corps could never have reached the 1st Airborne at Arnhem in time.

Flaws in the plan became more evident day by day, but Browning refused to advise Montgomery to reconsider the operation. On 12 September, Sosabowski heard that the number of gliders allocated to him had been reduced. He would have to leave behind all his artillery, while his anti-tank guns would be landed on the opposite side of the river to his main force. Two days later, he pointed out that the bridgehead to be held extended for 10 miles in difficult terrain. There was thus the possibility that his brigade might have to drop straight onto enemy-held ground. And if the British failed to capture the bridge, the Poles would unfortunately be left on the wrong side of the river.

British brigade commanders were not nearly so critical, mainly because they could not face another cancellation. They just wanted to get on with it. And, in the view of Brigadier Hicks, who commanded the 1st Air Landing Brigade, Market Garden at least seemed to stand a better chance than several "absolutely insane" previous plans.

Brigadier General Jim Gavin of the 82nd



Adrift in a sea of enemies

ABOVE Soldiers of the British 11th Parachute Battalion surrender. The battalion was decimated at Arnhem after it was caught in the open while trying to take high ground

LEFT In an image that gives a sense of the ambition of Operation Market Garden, waves of paratroopers from the 1st Allied Airborne Army land in the Netherlands in September 1944

Airborne was appalled that Urquhart should have accepted drop and landing zones so far from his main objective. Yet Gavin himself had been told by Browning that his first priority was to secure the Groesbeek heights south-east of Nijmegen. They overlooked the Reichswald, a great forest just across the German border, thought to conceal tanks. Browning's argument was that if the Germans occupied the Groesbeek heights, then their artillery could stop XXX Corps reaching Nijmegen. Its great road bridge thus slipped down to become a lower priority, partly because the 1st Allied Airborne Army did not want to land coup de main glider parties.

Montgomery refused to listen when Eisenhower's HQ expressed concern about German strength around Arnhem. The SS Panzer Divisions Hohenstaufen and Frundsberg were indeed in the area, although with only three serviceable Panther tanks and fewer than 6,000 men between them. Yet they were still able to form a nucleus onto which other, less experienced units could be grafted. What the Allies failed to grasp was the extraordinary ability of the German military machine to react with speed and determination. Almost all the tanks that Allied troops faced in Market Garden were not present at the start of the operation, but were brought in from Germany on Blitztransport trains.

Anyone with any experience of airborne operations could see that the British landing and dropping zones, up to eight miles to the

west of Arnhem, were too far away to achieve surprise. Major General Richard Gale, who had commanded the 6th Airborne Division on D-Day, warned Browning that the lack of coup de main parties was likely to be disastrous and that he would have resigned rather than accept the deeply flawed plan. Browning refused to agree and asked Gale not to mention it to anyone else, as it might damage morale.

There was little Urquhart could do about the other basic flaw. While the 1st Parachute Brigade was to march off towards the bridge, Hicks's 1st Airlanding Brigade would have to remain behind to guard the drop and landing zones ready for Hackett's 4th Brigade. This meant that Urquhart had just a single brigade to secure his chief objective, and his division would be split in two with a wide gap in-between. Worse still, his signals officers were rightly worried that their radios might not work over that distance.

Suicide operation

Urquhart gave no hint in any of his reports, or in his book written after the war, that he opposed the plan, but then he was not a man to rock the boat or contradict the subsequent version of events that Arnhem had been a heroic, worthwhile gamble. Yet according to General Browning's aide, Captain Eddie Newbury, on 15 September Urquhart appeared in Browning's office at Moor Park and strode over to his desk. "Sir," he said, "you've ordered me to plan this operation and I have done it, and now I wish to inform

you that I think it is a suicide operation."

The fears of those who had grave doubts about Market Garden were soon realised. Out of the 1st Airborne Division, only a single battalion made it to the bridge at Arnhem and could hold no more than its northern approach. At Nijmegen, the 82nd Airborne lacked the strength to secure its flank on the German border and also seize the great bridge over the Waal until after the much-delayed Guards Armoured Division finally arrived. By then the battalion at the Arnhem bridge had been crushed, and on 25 September, the battered remnants of the 1st Airborne at Oosterbeek had to evacuate to the south bank of the Lower Rhine. Out of approximately 10,600 men north of the Rhine, some 7,900 were left behind – dead, wounded and PoWs.

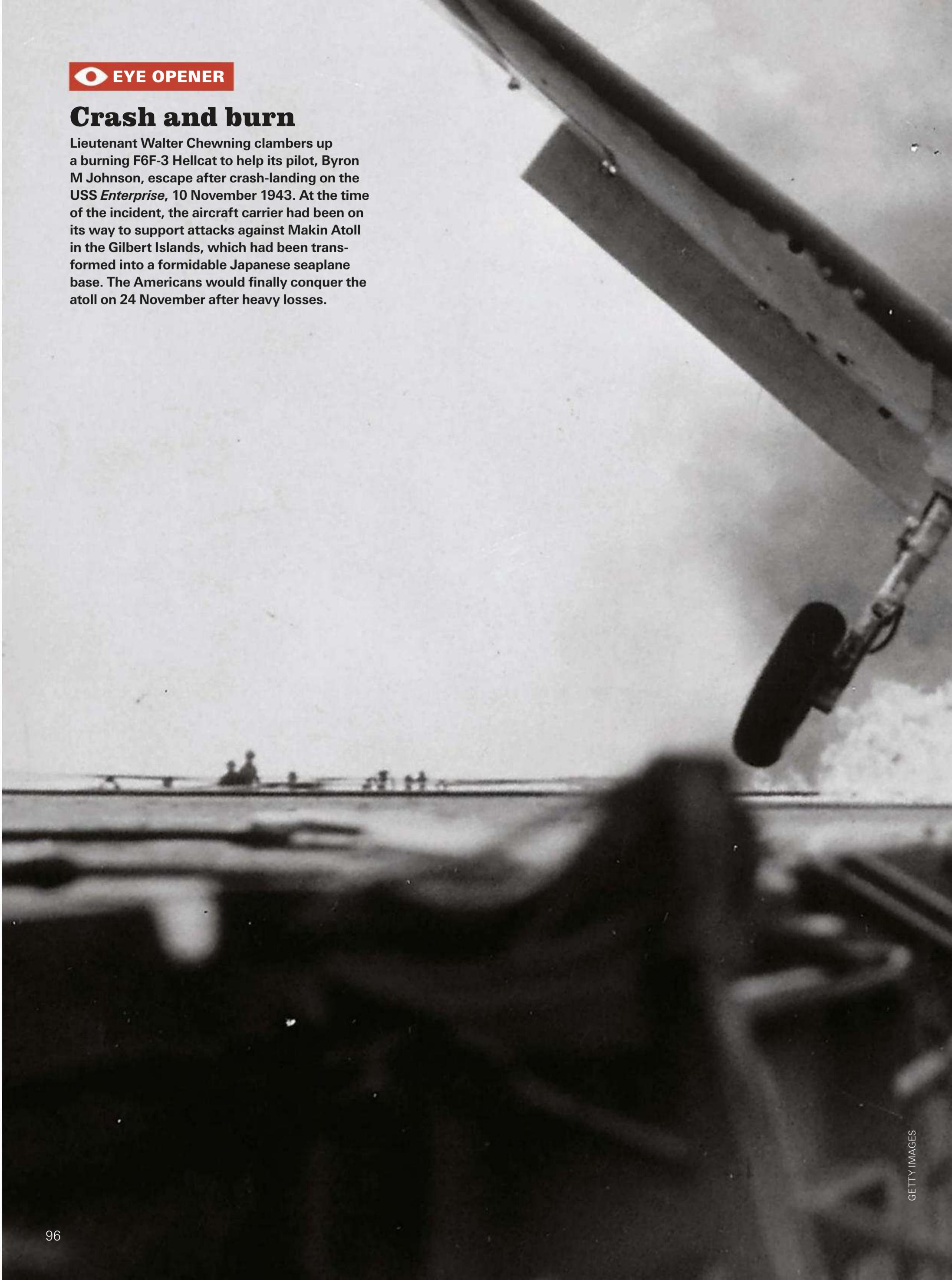
Unfortunately, the Dutch suffered not just the 3,600 killed and nearly 20,000 severely disabled in the fighting, but faced German vengeance afterwards for having helped the Allies. More than 200,000 civilians were forced from their homes, which were looted and destroyed. The northern Netherlands were then subjected to famine quite deliberately in what became known as the Hunger Winter, with around 18,000 dying from starvation. They were the chief victims of the disastrous plan for Operation Market Garden. ■

Antony Beevor is one of the leading historians of the Second World War. His books include *Arnhem: The Battle for the Bridges, 1944* (Viking, 2018)



Crash and burn

Lieutenant Walter Chewning clambered up a burning F6F-3 Hellcat to help its pilot, Byron M Johnson, escape after crash-landing on the *USS Enterprise*, 10 November 1943. At the time of the incident, the aircraft carrier had been on its way to support attacks against Makin Atoll in the Gilbert Islands, which had been transformed into a formidable Japanese seaplane base. The Americans would finally conquer the atoll on 24 November after heavy losses.

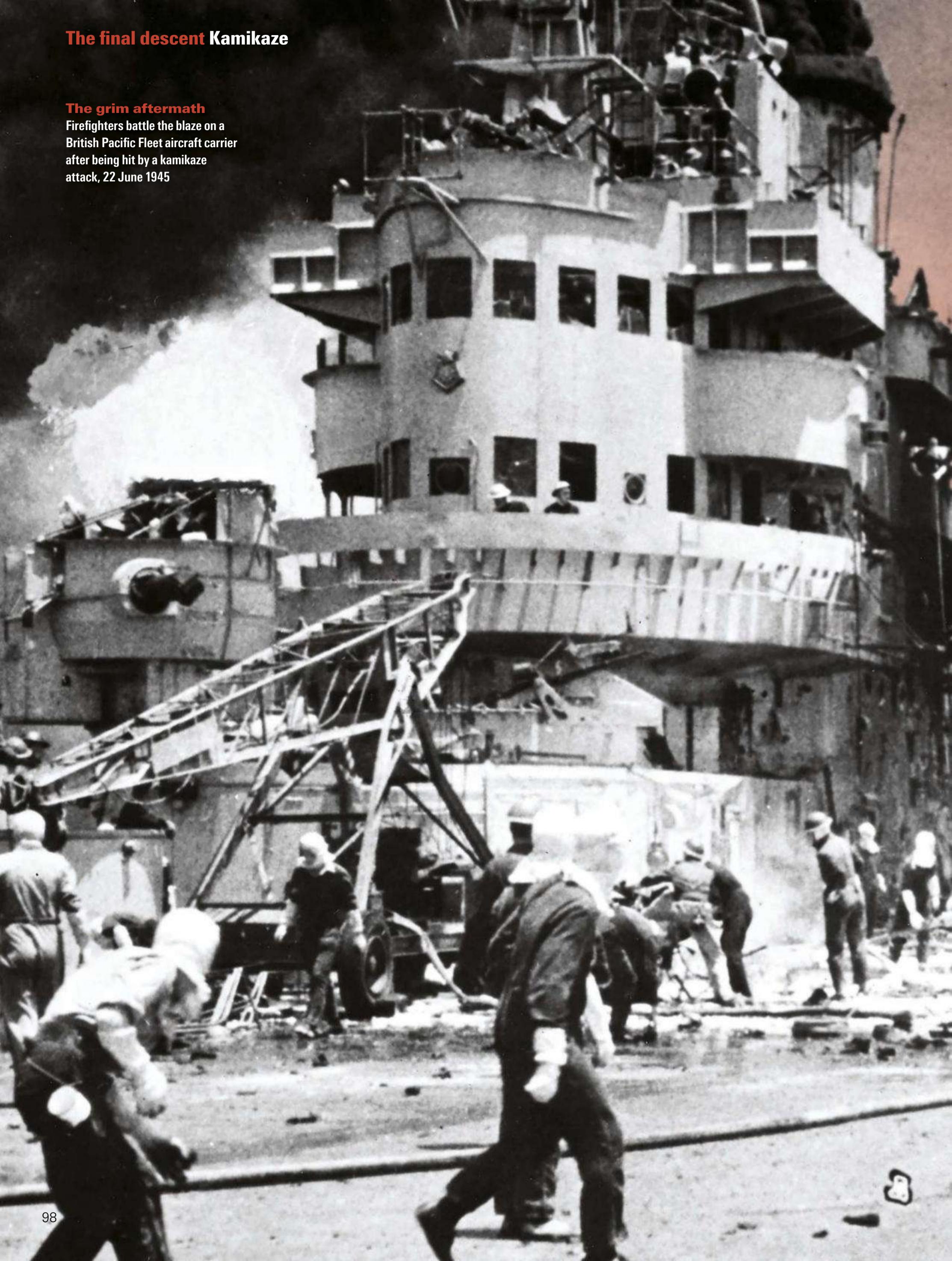




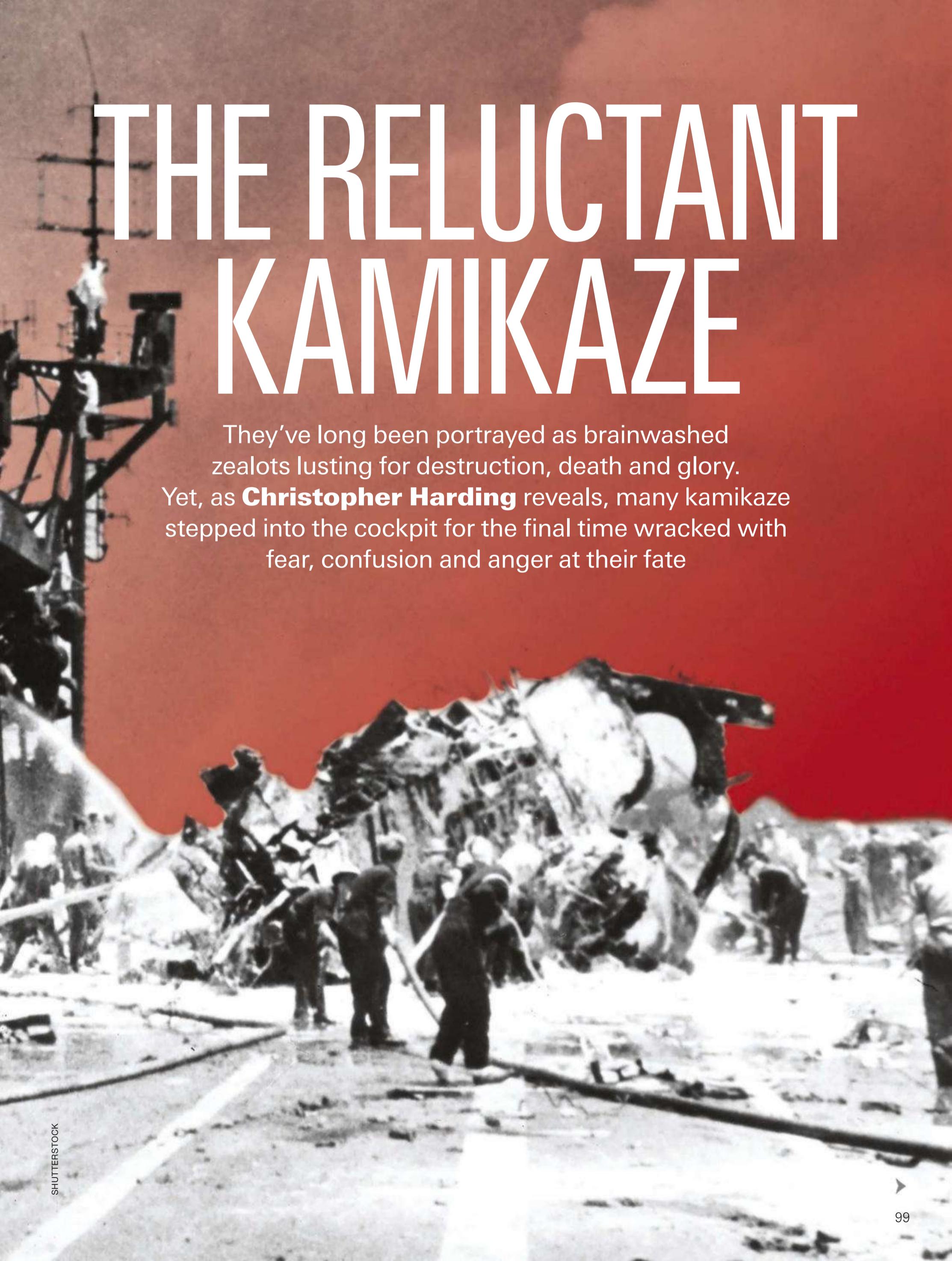
The final descent Kamikaze

The grim aftermath

Firefighters battle the blaze on a British Pacific Fleet aircraft carrier after being hit by a kamikaze attack, 22 June 1945



THE RELUCTANT KAMIKAZE



They've long been portrayed as brainwashed zealots lusting for destruction, death and glory.

Yet, as **Christopher Harding** reveals, many kamikaze stepped into the cockpit for the final time wracked with fear, confusion and anger at their fate

The final descent Kamikaze

On 12 April 1945, Ichizo Hayashi found himself inside a plane, screaming downwards through the humid Okinawan air towards an American warship below. There was no turning back. So heavy were the high explosives stuffed into the nose of his rattling Mitsubishi Zero that Hayashi would have been unable to pull the plane around even if he'd tried.

"Aim for the smokestack," he said to himself, dutifully recalling one of the kamikaze manuals. "Crash with your eyes wide open. Many have done so before you – they will tell you what fun they had."

Pulling up a little to skim the bright blue tropical sea, Hayashi saw the ship's guns begin to swivel in his direction. American servicemen gestured frantically to one another as they tried to aim an accurate shot at his plane before it was too late.

They failed. Badly buffeted by near misses, Hayashi managed to hold his course. Mere metres away, as the dull grey metal of the doomed ship began to fill his cockpit window, Hayashi shouted into his radio one last time: "Tenno heika, banzai!" ("Long live the emperor!") And then his world went black.

So, at any rate, ran the dreams of Hayashi's commanding officers – not one of whom volunteered for the sort of mission Hayashi undertook that day. In reality, few of those who flew the kamikaze sorties designed to stave off defeat in Japan's catastrophic war came from senior ranks or boasted much skill as pilots. Most kamikaze were young men who had seen the inside of a cockpit for the first time only a short while before their final, fateful missions.

Volunteers or victims?

From October 1944, when the first attacks took place, to the end of the war, nearly 4,000 Japanese pilots flew kamikaze sorties – creating guided explosive missiles out of piloted planes.

Why did they do it? Why throw away a young life in an act of such spectacularly destructive suicide? For many years after the war, these questions were answered in the west through popular imagery of brain-washed zealotry, of reckless inhumanity. Even in Japan, the word kamikaze – coined by the military to recall the 'divine winds' that miraculously saved Japan from sea-borne Mongol invasion in the 1200s – came to be used to admonish dangerous drivers or irresponsible skiers.



Last goodbye Japanese schoolgirls wave cherry blossom as they bid farewell to a kamikaze pilot heading for Okinawa in April 1945
INSET A burial at sea for crew of USS *Intrepid* after a kamikaze attack on 26 November 1944. The ship suffered five such attacks during the war

**ONE PUPIL WROTE:
"TO DIE AT THE
DEMAND OF THE
NATION – I HAVE
NO INTENTION TO
PRAISE IT; IT IS A
GREAT TRAGEDY"**

But the diaries, letters and poems of some of these pilots, belatedly making their way into English in recent years, tell a very different story. It is a far less comforting tale than the old one, because the real lives and deaths of young men like Ichizo Hayashi turn out to be more moderate and human than we might like to admit.

Hayashi was just nine years old when Japan's war with China began in 1931. It was soon to turn into a much wider conflict, billed by its military architects as 'existential'. In lessons and songs at school, in street parades and in swashbuckling magazine pieces about the military, the message was always the same: Japan is in danger from the racist, greedy empires of the west, and she must fight for survival.

The warning was reflected in everyday life: jazz and theatre-going gave way to martial music and shrine visits; electricity and food were rationed; the vivid colours and materials of Japanese dress faded and coarsened into the near-shapeless monochrome of 'national civilian uniform'.



TRAGIC DEATHS?

Rather than dying in a blaze of glory, many kamikaze lamented their fate

Was a kamikaze death honourable? Was it evil – or tragic? For Japanese military and newspaper supporters at the time, this was a picturesque form of self-sacrifice. The flower of the nation's youth was prepared to extinguish itself in order to keep that nation safe.

Cherry blossom, which in Japan blooms briefly and brilliantly, became a favoured symbol for the kamikaze. Young girls waved cherry branches laden with blossom as the pilots taxied out, and some of the planes were painted with a cherry blossom symbol. For a society raised on glorified accounts of its own history, the legendary deaths of loyal samurai also came readily to mind – helped by military, media and educational establishments well versed in spinning symbols and stories into potent propaganda.

For a time after 9/11, the infamous attacks on the World Trade Center on 11 September 2001, the kamikaze were thought of, in the west at least, as early examples of terrorist fanaticism. They had used spiritual techniques to prepare (many practised meditation), they had expected to be rewarded in the afterlife, and had been utterly intent on their goal.

Most of these parallels have proven wide of the mark, and in recent years the mood has changed. For Japanese people, and increasingly in the west, these deaths now seem a matter of military leaders refusing to admit the inevitability of defeat and condemning young people to deaths that were as horrific as they were unnecessary.

Some pilots no doubt fitted the stereotype of unreflective zeal and a yearning to become a 'war god' after death. But the loneliness and desperate search for meaning seen in kamikaze writings – by young men upon whom, as one pilot put it, "at the height of life... the curtain goes down" – point most powerfully to tragedy.

Little wonder that some of Hayashi's fellow kamikaze pilots show they were convinced even while at high school that they would soon perish in combat. "I have to accept the fate of my generation to fight in the war and die," wrote one pupil – who didn't, however, think this fate right or fair. "We have to go to the battlefield to die without being able to express our opinions, criticise and argue... To die at the demand of the nation – I have no intention whatsoever to praise it; it is a great tragedy."

A few of those who went on from school to one of Japan's imperial universities saw their anxiety and fatalism turn to radical opposition. But by 1945 even they had opted for silence or had undergone a sudden 'conversion' of their views. Japan's 'thought police' were notoriously persuasive, sometimes starting out by cooking a homely meal – "Your mother is worried about you: now eat up, stop all this nonsense, and get on home" – and, if that didn't work, moving on to straightforward torture and 'accidental' deaths in custody.

For the rest, studying history or literature offered no more than a new, grander palette with which to paint the dark times into which they had been born. By 1944 the Allies were retaking Europe, and Japan's empire was shrinking back towards the home islands. Students who studied the past came to see their imminent sacrifice as a part scripted for them by this and longer stretches of world history, as much as by the government in Tokyo busily churning out red conscription papers. As one kamikaze pilot bluntly put it: "I made a mistake being born in this century."

In no sense that they would have recognised were the likes of Ichizo Hayashi 'committing suicide' by signing up for and going through with their kamikaze missions. Hayashi had already contemplated that step in the past. Now, the element of choice for him had disappeared. "Death is given to me," he wrote.

Lovers of art, philosophy and nature, too, found meaningful stories to tell themselves, discarding trite, militarist slogans in favour

The final descent Kamikaze

of more inspiring thoughts: the flowers of their hometowns, the beauty of the moon over their military training bases, the faces of their families, and the better world to come after the war. In late 1943, a pilot named Hachiro Sasaki quoted from a children's story:

"I pray that we will see the day as soon as possible when we welcome a world in which we do not have to kill enemies whom we cannot hate. For this end, I would not mind my body being ripped innumerable times."

Many of the pilots wrote as lyrically about sacrifice as they did about inevitability. They had heard about it, day in and day out, as the war gathered pace: from parents and teachers, from religious leaders and philosophers. Even Japan's first psychotherapists became involved, lamenting the degeneration of western individualism into a diseased egotism and trying to help the youth of Japan to – as they saw it – balance their own desires with the needs of their families and Japanese society.

By December 1943, when university students were suddenly conscripted in their thousands, a positive case for war seemed to have become surplus to requirements. It was as though the more hopeless Japan's situation became, the more acutely the call was felt to give whatever one had: "For our nation," one of the pilots commented, "enormously poor in material resources, the last [form of] capital is the body."

Fear of death

Marched out of their classrooms and into great army and navy halls, these students were asked in front of their peers if they wished to volunteer for the kamikaze corps. For most, the great issue at stake – life or death – had been decided long ago, and not by them. They stepped forward.

Over the next few months, these 'volunteers' – including the few who had held back, only to find their names added to the list anyway – spent their days receiving severe newbie beatings and a meagre pilot training, and their nights struggling to keep their heroic romanticism intact. Ichizo Hayashi wrote in his diary: "It is easy to talk about death in the abstract, as the ancient philosophers did, but it is real death I fear. [Japanese military personnel] are killing infants and innocent civilians in China... but there is no more time for me to escape."

A good many pilots adopted the views of their new comrades and superiors, their writings turning from poetry and history to stereotyped and rather unconvincing



Preparing for the end

A pilot puts on his *hachimaki*, a bandana featuring Japan's Rising Sun symbol, worn as a display of patriotism and courage

anticipations of glorious and beautiful deaths. Few kept it up, however. They soon dissolved back into confusion and longing – for families and lovers, for release from the sheer absurdity of their situation.

It rapidly became too much. Pilots drank and rioted in their barracks, or took their good-luck sashes – each one crafted intricately from a thousand civilian stitches – and burned them in sheer disgust. At least one pilot strafed his own base shortly after taking off for his final flight. Many kamikaze sabotaged their planes or deliberately steered them into the sea, well short of their targets.

In the end, the kamikaze strategy proved nowhere near as effective as hoped. Early attacks enjoyed the element of surprise, but once the Americans knew what to expect and had their radar systems operational, heavy and barely manoeuvrable planes made for pitifully easy prey. Nearly 4,000 pilots died, against the loss of 40 or so American ships.

If anything, the missions made things worse for Japanese at home. Resistance on islands such as Saipan and in the skies near the mainland helped convince the Americans that the secret weapon they were developing in the desert of New Mexico might be the only way to end the war. Hiroshima and Nagasaki were among the cities being spared conventional bombing for the time being, the better to assess the new weapon's power.

No one knows how 12 April 1945 really ended for Ichizo Hayashi. But this is how it began. Wearing the Rising Sun headband and the pure white scarf that formed the legendary attire of the kamikaze, Hayashi stepped into his plane carrying three things: a Bible, a copy of Søren Kierkegaard's *The Sickness Unto Death*, and a photograph of his mother. The two of them were Christians: the final layer of meaning – of inevitability – about the war and Hayashi's unsought part in it was that, in his last words to his mother, he said, "All is in God's hands".

"This is like a dream," he wrote. "Tomorrow, I am no longer alive. Those who went on sortie yesterday are all dead – it doesn't feel real. I wonder if I will be allowed to enter heaven. Mother, please pray for me. I cannot bear the thought of going to a place where you will not join me later." 

MANY KAMIKAZE SABOTAGED THEIR PLANES OR DELIBERATELY STEERED THEM INTO THE SEA, WELL SHORT OF THEIR TARGETS

Christopher Harding is a senior lecturer in Asian history at the University of Edinburgh. His new book, *The Japanese: A History in Twenty Lives*, will be published by Allen Lane in November 2020

“I AM BECOME DEATH, THE DESTROYER OF WORLDS”

Seventy-five years ago, the crew of the Enola Gay dropped ‘Little Boy’ on Hiroshima. **Diana Preston** traces the leaps in scientific thought and twists of political circumstance that made the atomic bomb a terrifying reality

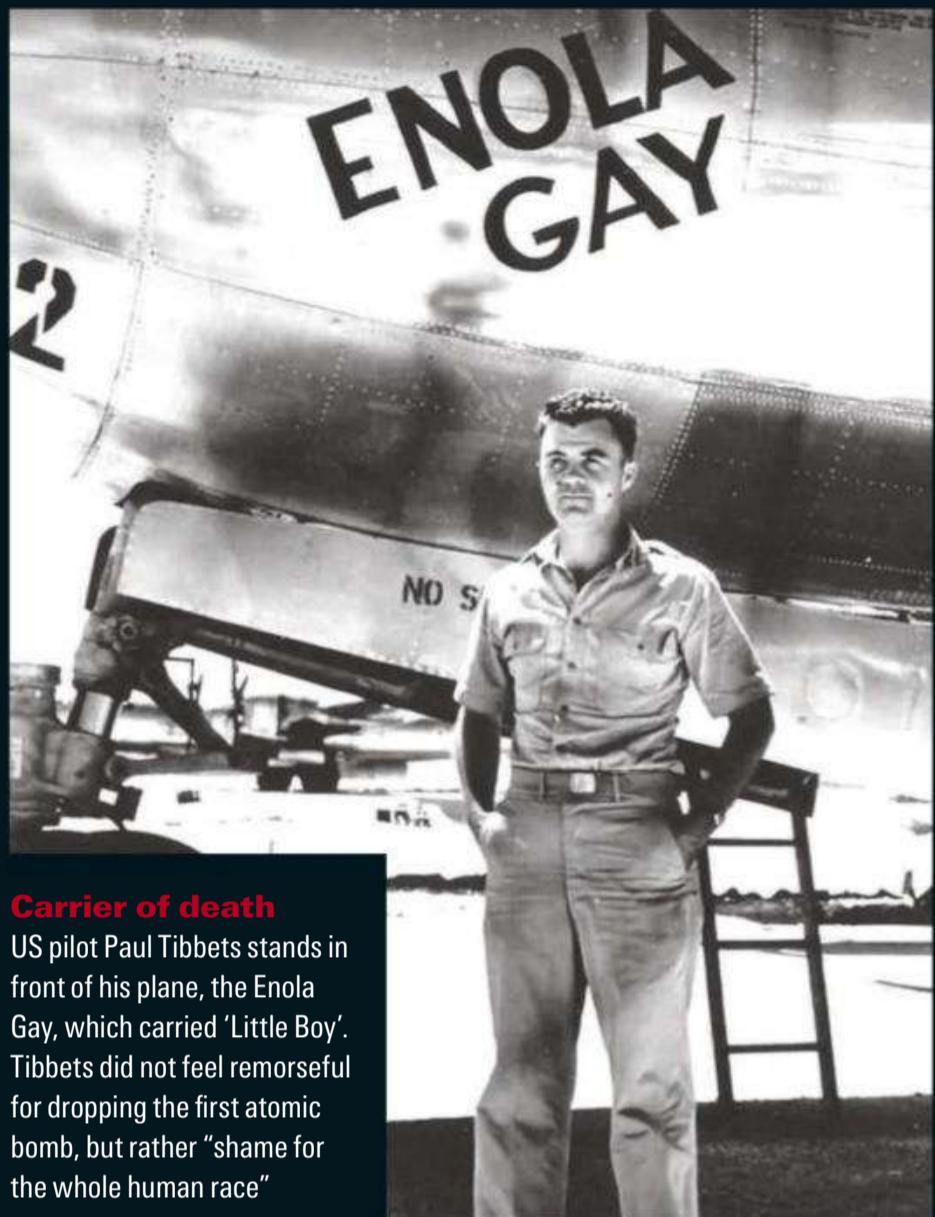


Scientists Frederic Joliot-Curie and his wife, Irene, at work in their Paris laboratory in December 1932. The couple were among a wide-ranging group of scientists whose work paved the way for the atomic bomb



World of pain

Survivors of the atomic bombing lie in hospital beds in Hiroshima, suffering from the effects of radiation. As well as the 80,000 who died in the blast, 60,000 had succumbed to radiation sickness and related diseases by December 1945



Carrier of death

US pilot Paul Tibbets stands in front of his plane, the Enola Gay, which carried 'Little Boy'. Tibbets did not feel remorseful for dropping the first atomic bomb, but rather "shame for the whole human race"

In Hiroshima on 6 August 1945 – the day of the Christian Feast of the Transfiguration – a young mother, Futaba Kitayama, looked up to see "an airplane as pretty as a silver treasure flying from east to west in the cloudless pure blue sky". Someone standing by her remarked: "A parachute is falling." Then the parachute exploded into "an indescribable light". The American B-29 bomber Enola Gay had just dropped 'Little Boy', a four-tonne bomb which detonated with the power of 15,000 tonnes of TNT. Pilot Paul Tibbets, who had named his plane after his own mother, struggled to hold it steady as the first shock waves hit. Bathed in bright light, he looked back and saw "a giant purple mushroom boiling upward". Over the intercom he announced to his shaken crew: "Fellows, you have just dropped the first atomic bomb in history."

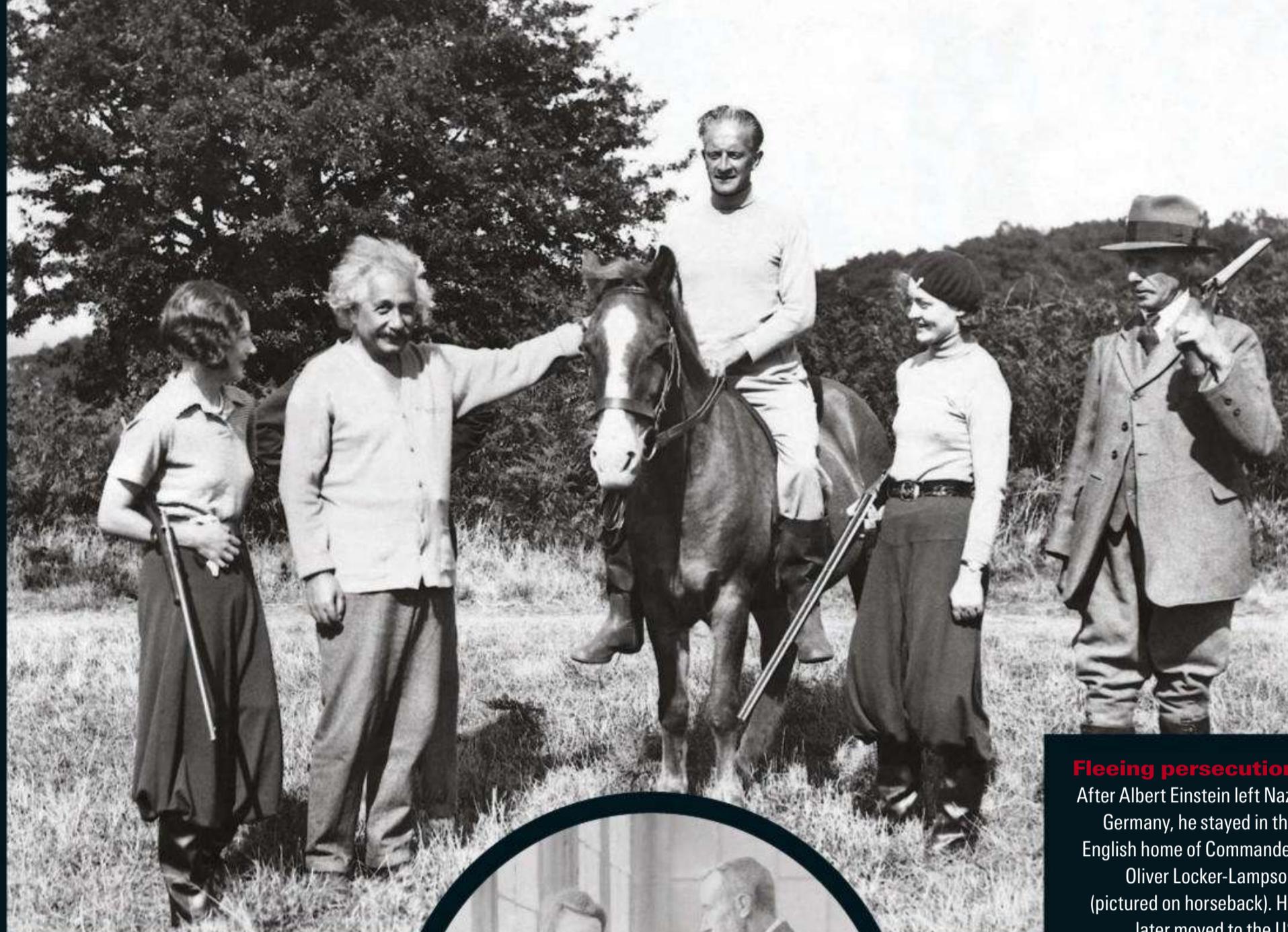
The destructive flash that seared Hiroshima into history was the culmination of 50 years of scientific creativity and innovation, and over 50 years of political and military turmoil. Generations of scientists had contributed to that moment. Yet, as they began uncovering the minute building blocks forming the world around them, few could have predicted how their compulsive curiosity would combine with political events to produce a devastating new weapon.

THE DESTRUCTIVE FLASH THAT SEARED HIROSHIMA INTO HISTORY WAS THE CULMINATION OF 50 YEARS OF SCIENTIFIC CREATIVITY AND POLITICAL TURMOIL

The journey began at the end of the 19th century, often called the chemists' century (as opposed to the 20th, which physicists would dominate). The first step to the bomb arguably arrived in the mid-1890s, when Henri Becquerel found that uranium emitted energy rays. Subsequently, Marie Curie experimented with uranium as well as other elements. She discovered that thorium also emitted these enigmatic rays, which she later called 'radioactivity'.

New Zealand physicist Ernest Rutherford found that uranium actually emitted two types of radiation – alpha and beta – and probably a third. He was correct about the latter; this third type would be called gamma.

In 1919, Rutherford made history again. He became the first person to chip a piece off an atomic nucleus, in the process identifying a sub-atomic particle – the positively charged proton (his mentor, JJ Thomson, had discovered electrons some years before). Rutherford already suspected the presence of another particle within the nucleus: the neutron. One of his former pupils, James Chadwick, discovered the sub-atomic particle at Cambridge University's Cavendish Laboratory in 1932. The neutron contained no charge – hence its name – and, if used to bombard elements, it could penetrate atomic nuclei without being deflected. Thus, it was an ideal tool for



Fleeing persecution

After Albert Einstein left Nazi Germany, he stayed in the English home of Commander Oliver Locker-Lampson (pictured on horseback). He later moved to the US

the investigation of atoms.

The year 1932 was a scientific annus mirabilis. Also at the Cavendish, John Cockcroft and Ernest Walton built the first machine – using plasticine to seal its joints; the Cavendish did not encourage extravagance – to disintegrate an atomic nucleus with accelerated particles. Their device, dubbed a linear accelerator, provided the first experimental confirmation of Einstein's theory of $E = mc^2$ (energy is equal to mass times the speed of light squared), implying that enormous amounts of energy could be squeezed from a tiny mass.

A community torn apart

But in 1933 – the year when Rutherford dismissed the idea of harnessing energy from atoms as “moonshine”, and when Hitler came to power – the scientists' world changed. Previously a small, close-knit community, they had met frequently at international conferences – disparagingly termed “witches' sabbaths” by Einstein – and published their results openly. Now, friendships and professional partnerships were sundered, as many were compelled to flee Nazi Germany and other countries gripped by totalitarian regimes because of their race or political views. Einstein crossed the Channel to England, protected by the British Naval Commander Oliver



Building momentum

Marie Curie with her husband, Pierre, in a Paris laboratory c1896. In 1898, the duo discovered two new radioactive elements: polonium and radium

Locker-Lampson. However, finding England too formal (he preferred “No butlers. No evening dress”), he accepted a post at Princeton University in the US.

Against this increasingly tense backdrop, the final pieces of the atomic jigsaw were dropping into place. In France, Marie Curie's daughter, Irene, and her husband, Frederic Joliot-Curie, discovered how to force nuclei to disintegrate to form new, unstable elements that released radioactive energy as they decayed – so-called ‘artificial radioactivity’. In Rome, physicist Enrico Fermi found that firing neutrons at a target substance through a filter of water – his assistants carried it in buckets from the goldfish pond in the garden behind his laboratory – dramatically slowed the neutrons' speed, enhancing their chances of hitting and penetrating the target nuclei.

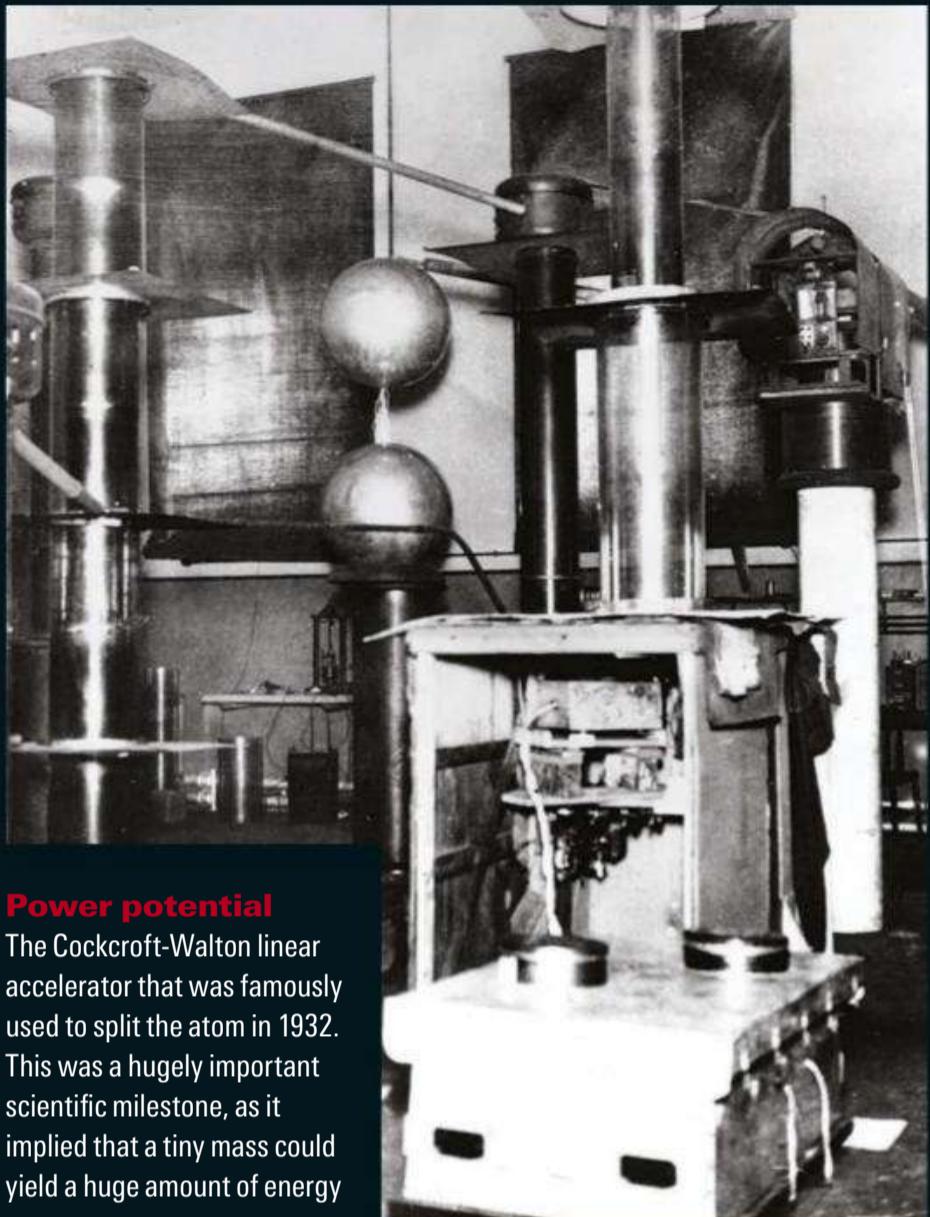
However, in Mussolini's Italy, Fermi's Jewish wife was in danger. Awarded the Nobel prize, he used the ceremony in Stockholm as a pretext to leave Italy with his family and travel to the US. Like other scientists, Fermi had friends in Germany, two of whom – the chemist Otto Hahn and Vienna-born Jewish physicist, Lise Meitner – were renowned for their experimental work.

In 1938, with Hahn's help, Meitner fled to Sweden, where Hahn sent her results from



Pushing for peace

Dr Leo Szilard and his wife, Gertrud Weiss Szilard, receive news that he has won the 1959 Atoms for Peace Award. Along with Einstein, Szilard wrote a letter to Roosevelt warning him of the dangers of atomic weapons



Power potential

The Cockcroft-Walton linear accelerator that was famously used to split the atom in 1932. This was a hugely important scientific milestone, as it implied that a tiny mass could yield a huge amount of energy

experiments on uranium that he had conducted but could not interpret. During a cold, snowy walk with her nephew, physicist Otto Frisch, Meitner pondered the results and realised that Hahn had succeeded in splitting the uranium nucleus, releasing energy. Back in Copenhagen, where he was working with Danish scientist Niels Bohr, Frisch asked American biologist William A Arnold what he called the process by which single cells divided. Arnold replied: "fission."

Soon after, while in the United States, Bohr announced the discovery of fission. However, his own studies showed that of the two isotopes present in uranium – U-238 and U-235 – only the much rarer U-235, constituting less than 0.7 per cent of natural uranium, actually fissioned. This reassured him that an atomic bomb was not viable, since it would take a gigantic effort to separate enough U-235 fuel from natural uranium; "you would need to turn the entire country into a factory," Bohr believed.

Exposing nature's secrets

Hungarian scientist Leo Szilard, now in the US, was less certain that an atomic bomb was impossible, and he lobbied fellow scientists to keep 'nature's secrets' secret. However, the Joliot-Curies were not swayed by Szilard's pleas, and in March 1939 they published a paper suggesting a chain

"ALTHOUGH PERSONALLY I AM QUITE CONTENT WITH THE EXISTING EXPLOSIVES... WE MUST NOT STAND IN THE PATH OF IMPROVEMENT"

reaction – a self-sustaining nuclear reaction triggered when a neutron induces a nucleus to fission, releasing energy and causing further fissions – in uranium may be possible. In August 1939, an alarmed Szilard persuaded Einstein to write to US president Franklin D Roosevelt, alerting him to the dangers of nuclear weapons. One of his advisors convinced an initially sceptical Roosevelt to act, and the Uranium Committee was established.

The outbreak of the Second World War meant many British physicists turned to war work, in particular radar. Excluded from classified projects, refugee scientists in Britain continued to ponder an atomic weapon. They included Otto Frisch, now in England, and German-born Rudolf Peierls. Hunched over a small gas fire at the University of Birmingham in the bitterly cold winter of 1940, they calculated the amount, or 'critical mass', of fissionable U-235 needed to release sufficient neutrons to spark a self-sustaining chain reaction to create an atomic bomb. The Joliot-Curies had estimated 40 tonnes. Peierls and Frisch calculated about one pound.

Scribbling on the back of an envelope, they calculated the energy released as equivalent to thousands of tonnes of ordinary explosive. Peierls recalled: "We were quite staggered... an atomic bomb was



Sparks of change

A female welder works in a K-25 uranium enrichment plant at Oak Ridge, Tennessee.

The facility's workers were mostly women, as many men were away fighting in the war

possible, after all, at least in principle!" They composed the Frisch-Peierls memorandum, a compelling three-page document which they presented to the British government in March 1940. It dealt with scientific, strategic and ethical issues, suggesting that the very high likely number of civilian casualties "may make it unsuitable as a weapon for use by this country". But, as Germany might have been working on a bomb, they suggested Britain could develop one as a deterrent, "even if it is not intended to use the bomb as a means of attack".

The high-powered Maud Committee reviewed the memorandum, and in summer 1941 they recommended that Britain should institute an atomic bomb project. Churchill agreed: "Although personally I am quite content with the existing explosives... we must not stand in the path of improvement." British scientists sent copies of the report to colleagues in the still-neutral US, which they used to convince Roosevelt to increase fission research. After Pearl Harbor and America's entry into the war, that relatively modest work expanded into the vast scientific and engineering effort codenamed the 'Manhattan Project', which cost \$2bn, ballooned to the size of the US car industry and employed 130,000 people.

Under the overall supervision of General Leslie Groves, the project's scientific core,

led by physicist Robert Oppenheimer, was based at Los Alamos in New Mexico, where a small British team under James Chadwick joined it. On 2 December 1942, in a nuclear pile (reactor) under the west stands of Chicago University's disused football stadium, Enrico Fermi achieved the world's first self-sustaining chain reaction. This convinced President Roosevelt to fund industrial-scale plants to produce U-235 and also plutonium – an alternative fissionable element created at Berkeley.

Nazi Germany had surrendered before the Manhattan Project team felt confident they were ready. The world's first nuclear explosion – the Trinity test – took place on the morning of 16 July 1945 in the New Mexico desert, producing the equivalent of 20,000 tonnes of TNT. The brilliant blinding flash "told us... we had done our job", Peierls recalled. As for Oppenheimer, he remembered that a line from the Hindu scripture *Bhagavad Gita* raced through his brain: "I am become Death, the destroyer of worlds."



Father of the bomb

The ID card for J.R. Oppenheimer, one of the lead scientists on the Manhattan Project

Locking onto the target

The target now was Japan, where the military estimated the atomic bomb might save a million young American lives that would otherwise be lost in invading the Japanese home islands. A target committee, with British as well as American members,

The final descent The race for the bomb



Boiling clouds The atomic bombing of Nagasaki on 9 August 1945. This second attack came just three days after Hiroshima was bombed, and it also caused widespread death and destruction



War is over

Japanese signatories arrive at the USS *Missouri* in Tokyo Bay for the surrender ceremonies

identified the key criterion for deciding where the bomb should fall: "Obtaining the greatest psychological effect against Japan". They whittled suitable targets down to three: Hiroshima, Kyoto and Niigata. When US Secretary of War Henry L Stimson removed Kyoto because of its cultural significance, Nagasaki replaced it.

Waiting with his crew on the Pacific island of Tinian, Paul Tibbets learned Hiroshima was his primary target, unless cloud cover was too thick. The final decision would depend on reports from weather planes flying ahead of him. At 2.45am, 6 August 1945, Tibbets opened the throttles, and the heavily laden Enola Gay accelerated slowly down the chopped coral runway. Little more than 100 feet from its end, he eased the B-29 safely and steadily into the northern sky.

Just over five hours later, a weather plane assigned to Hiroshima radioed that cloud cover was relatively light. Tibbets told his crew: "It's Hiroshima." At 8.15am Hiroshima time, they were over the city, the Enola Gay's bomb doors opened and, Tibbets later wrote, "out tumbled 'Little Boy'". It exploded with a temperature of 1 million degrees centigrade at its heart, generating a white-hot fireball. Seeing the boiling clouds, his co-pilot Robert Lewis scribbled on his notepad: "My God, what have we done?" Futaba Kitayama, who had watched it fall, ran for her life. She recalled that in the river, "corpses were floating like dead dogs... their

shreds of clothing dangling like rags". She also recounted: "I saw a woman floating face up, her chest gouged out, and gushing blood. Could such terrifying sights be of this world?" On the banks, school children writhed, "crazed, crying, 'mother, mother'".

As the fires grew in intensity, heavy rain began to fall. At first it came down in large, sticky black drops – "black rain" – as water intermingled with soot, dust and debris flung into the air by the explosion and radioactive material. Traumatised people instinctively opened their mouths to cool their parched throats. At his clinic two and a half miles from the epicentre, army doctor Hiroshi Sawachika struggled to cope as badly burned people arrived. "They held their hands aloft. They looked like they were ghosts," he said. A heavily pregnant woman begged, "Please help my baby live," but he could do nothing.

A fractured nation

Japan surrendered on 14 August 1945, five days after a second bomb – the plutonium-fuelled 'Fat Man' – devastated Nagasaki. Exact casualty figures are hard to calculate. In Hiroshima, the authorities estimated the number of deaths by December 1945 to be around 140,000; there were approximately 350,000 people in the city when the bomb fell. Since then, deaths from radiation-related diseases have added to the toll.

Although Hiroshima is again a vibrant city with a population more than treble what



Ruined city

The devastated Hiroshima Prefectural Industrial Promotion Hall in 1945. The building has been left untouched as a memorial



Agonising smiles

Two 'Hiroshima maidens' receive a visitor at New York's Mount Sinai hospital, where they are undergoing plastic surgery. Like many of the bomb survivors, they have been badly disfigured

it was in August 1945, it still remembers. The former Hiroshima Prefectural Industrial Promotion Hall, close to the epicentre of the blast, has – apart from work to stabilise it – been left untouched, a shattered icon. Every day at 8.15am, a bell by the dome rings out, and for a moment passers-by pause and reflect. However, not all Hiroshima survivors are comfortable with how they are perceived. One commented: "I don't like this special view of us. I'd like to stand up as an individual."

The dropping of the atomic bomb cast a shadow over the lives of some of the Enola Gay's crew. Tibbets, the plane's pilot, repeatedly stated that he felt no personal guilt for doing what he saw as his military duty. However, he wrote in his memoirs: "I feel a sense of shame for the whole human race, which through all history has accepted the shedding of human blood as a means of settling disputes between nations."

His co-pilot, Lewis, raised money for medical treatment for the so-called 'Hiroshima maidens' – young girls disfigured by the blast. In 1971, he auctioned his log of the Enola Gay's flight and used part of the proceeds to buy marble from which he sculpted statues with religious themes. They included 'God's Wind', a mushroom-shaped statue that symbolically leaked blood.

For their part, many atomic scientists agonised at the time and later about the morality of a nuclear weapon. Oppenheimer returned to academic life and refused to

MANY ATOMIC SCIENTISTS AGONISED AT THE TIME AND LATER ABOUT THE MORALITY OF DEVELOPING A NUCLEAR WEAPON

support US plans to build an even more powerful nuclear weapon: the world's first hydrogen bomb. A variety of opponents, including fellow Manhattan scientist Edward Teller – devoted to what he called the "sweet technology" of the hydrogen bomb – used this, as well as Oppenheimer's leftwing sympathies, to attack him during the anti-communist McCarthy era.

Meanwhile, Joseph Rotblat – the only scientist to walk out of the Manhattan Project on conscience grounds – returned to England, his adopted homeland, and campaigned against nuclear proliferation. Working with other leading scholars, he founded the Pugwash Conferences: a means of bringing academics and public figures together to find peaceful solutions to global security threats. In 1995, he received the Nobel prize.

Of course, many more scientists who had been involved in the race to build the atomic bomb grappled with the moral implications of their ruinous creation. Perhaps the last word should fall to Einstein, who famously regretted the role he played in the development of nuclear weapons. He said: "Had I known that the Germans would not succeed in producing an atomic bomb... I would have never lifted a finger." ■

Diana Preston is the author of *Before the Fallout: From Marie Curie to Hiroshima* (Corgi, 2006). Her most recent book, out in paperback, is *Eight Days at Yalta* (Picador, 2020)

SHOULD AMERICA HAVE DROPPED THE BOMB?

America's use of atomic bombs against the Japanese cities of Hiroshima and Nagasaki in August 1945 has long remained one of the most controversial decisions of the war. Seven historians offer their views on whether US president Truman was right to authorise the attacks

Igniting controversy

The Japanese city of Hiroshima shortly after the US dropped the atomic bomb on 6 August 1945. The moral justification for the attack is still debated by historians today



"Yes. Truman had little choice"

says Antony Beevor

Few actions in war are morally justifiable. All a commander or political leader can hope to assess is whether a particular course of action is likely to reduce the loss of life. Faced with the Japanese refusal to surrender, President Truman had little choice.

His decision was mainly based on the estimate of half a million Allied casualties likely to be caused by invading the home islands of Japan. There was also the likely death rate from starvation for Allied prisoners of war (PoWs) and civilians as the war dragged on well into 1946.

What Truman did not know, and which has only been established relatively recently, is that the Imperial Japanese Army could never contemplate surrender, having forced all their men to fight to the death since the start of the war. All civilians were to be mobilised and forced to fight with bamboo spears and satchel charges to act as suicide bombers against Allied tanks. Japanese documents apparently indicate their army was prepared to accept up to 28 million civilian deaths.

Antony Beevor is a bestselling military historian, specialising in the Second World War. His most recent book is *Arnhem: The Battle for the Bridges, 1944* (Viking, 2018)



"No. It was immoral and unnecessary"

says Richard Overy

The dropping of the atomic bomb on Hiroshima was justified at the time as being moral – in order to bring about a more rapid victory and prevent the deaths of more Americans. However, it was clearly not moral to use this weapon knowing that it would kill civilians and destroy the urban milieu. And it wasn't necessary either.

Militarily, Japan was finished (as the Soviet invasion of Manchuria that August showed). Further blockade and urban destruction would have produced a surrender in August or September at the latest, without the need for the costly anticipated invasion or the atomic bomb. As for the second bomb on Nagasaki, that was just as unnecessary as the first one. It was deemed to be needed, partly because it was a different design, and the military (and many civilian scientists) were keen to see if they



Total devastation

Nagasaki, after the bomb. Was this second nuclear attack necessary to force Japanese surrender, or carried out for cynical, scientific reasons?



"Yes. It was the least bad option"

says Robert James Maddox

The atomic bombs were horrible, but I agree with US Secretary of War Henry L Stimson that using them was the "least abhorrent choice". A bloody invasion and round-the-clock conventional bombing would have led to a far higher death toll, so the atomic weapons actually saved thousands of American and millions of Japanese lives. The bombs were the best means to bring about unconditional surrender, which is what the US leaders wanted. Only this would enable the Allies to occupy Japan and root out the institutions that led to war in the first place.

The experience with Germany after the First World War had persuaded them that a mere armistice would constitute a betrayal of future generations if an even larger war occurred 20 years down the line. It is true that the radiation effects of the atomic bomb provided a grisly dividend, which the US leaders did not anticipate. However, even if they had known, I don't think it would have changed their decision.

Richard Overy is professor of history at the University of Exeter. His next book, *Blood and Ruins: A History of the Second World War*, is due to be published by Penguin in 2021

Robert James Maddox is a historian and the editor of *Hiroshima in History: The Myths of Revisionism* (University of Missouri Press, 2007)



"No. Japan would have surrendered anyway"

says Martin J Sherwin

I believe that it was a mistake and a tragedy that the atomic bombs were used. Those bombings had little to do with the Japanese decision to surrender. The evidence has become overwhelming that it was the entry of the Soviet Union on 8 August into the war against Japan that forced surrender but, understandably, this view is very difficult for Americans to accept.

Of the Japanese leaders, it was the military ones who held out against the civilian leaders who were closest to the emperor, and who wanted to surrender provided the emperor's safety would be guaranteed. The military's argument was that Japan could convince the Soviet Union to mediate on its behalf for better surrender terms than unconditional surrender, and therefore it should continue the war until that was achieved.

Once the USSR entered the war, the Japanese military not only had no arguments for continuation left, but it also feared the Soviet Union would occupy significant parts of northern Japan.

Truman could have simply waited for the Soviet Union to enter the war, but he did not want the USSR to have a claim to participate in the occupation of Japan. Another option (which could have ended the war before August) was to clarify that the emperor would not be held accountable for the war under the policy of unconditional surrender. US Secretary of War Stimson recommended this, but Secretary of State James Byrnes, who was much closer to Truman, vetoed it.

By dropping the atomic bombs instead, the United States signalled to the world that it considered nuclear weapons to be legitimate weapons of war. Those bombings precipitated the nuclear arms race, and they are the source of all nuclear proliferation.

Martin J Sherwin is a historian whose books include *Gambling with Armageddon* (Penguin Random House, 2020)



British captives The US feared Allied PoWs in Japan would starve if war dragged on

Scarred victims of the bombing of Hiroshima. Some historians argue that using an atomic weapon on civilians amounted to a war crime



"Yes. It saved countless lives"

says Richard B Frank

Dropping the atomic bombs was both necessary and morally preferable to any of the other choices available.

In my view, a pervasive amnesia about the horrific nature of Japan's war seems to invert western understanding of the conflict. Even by conservative estimates, some 19 million non-combatants perished during the Asia-Pacific War as a whole (1937–45), almost 95 per cent of whom were not Japanese. Furthermore, research by the historian John Dower shows that, whereas immediate and latent deaths due to the bombs totalled about 210,000, some 400,000–500,000 Japanese (all but 61,000 of them non-combatants) died in Soviet hands after the war had ended.

Another thing to bear in mind is that Japan was never close to surrender prior to Hiroshima. Not one of the men who controlled Japan's destiny ever claimed during or after the war that Japan would have surrendered if presented with terms like those argued by critics of the bombings. Indeed, when the Japanese ambassador in Moscow, conducting Japan's sole authorised diplomatic effort, insisted that the best deal the country could hope for was unconditional surrender modified to permit retention of the imperial system, it was emphatically rejected by Japan's foreign minister.

Thanks to code-breaking, Truman was made aware of the exchange, and the Japanese government's attitudes towards

surrender were confirmed. But crucially, Truman also received radio intelligence revealing that the Japanese had massed forces on Kyūshū, where they intended to turn the planned US landings on the island into a bloodbath and break the American will to prosecute the war. Therefore, when Truman decided to unleash the atomic weapons, he did so with this intelligence in mind.

Overall, the bombing of Hiroshima triggered the emperor's decision to end the war before Soviet intervention, while the bombing of Nagasaki convinced the Japanese diehards that the US had an arsenal of powerful bombs and would now not invade. And if the US did not invade, the diehards could only offer national suicide.

We should recognise the end of the Asia-Pacific War for what it was: a miraculous deliverance from a titanic tragedy involving not only Americans, but people across Asia, the vast majority of whom were not Japanese.

Richard B Frank is a historian and the author of *Tower of Skulls: A History of the Asia-Pacific War, Vol. I* (WW Norton & Company, 2020)

THE END OF THE ASIA-PACIFIC WAR SHOULD BE SEEN AS A MIRACULOUS DELIVERANCE FROM A TITANIC TRAGEDY



"No. Better options were discarded for political reasons"

says Tsuyoshi Hasegawa

Once sympathetic to the argument that the atomic bomb was necessary, the more research I do, the more I am convinced it was one of the gravest war crimes the US has ever committed. I've been to Japan and discovered what happened on the ground in 1945, and it was really horrifying. The radiation has affected people who survived the blast for many years, and today thousands of people still suffer the effects.

There were possible alternatives that might have ended the war. Truman could have invited Stalin to sign the Potsdam declaration [in which the US, Britain and nationalist China demanded Japanese surrender in July 1945]. The authors of the draft of the declaration believed that if the Soviets joined the war at this time, it might lead to Japanese surrender. However, Truman consciously avoided that option, as he and some of his advisors were apprehensive about Soviet entry. I don't agree with revisionists who say Truman used the bomb to intimidate the Soviet Union, but I believe he used it to force Japan to surrender before they were able to enter the war. As it turned out, the Soviet entry into the war was a more decisive factor than the atomic bombings on Japan's decision to surrender.

The second option was to alter the demand for unconditional surrender. Some influential advisors within the Truman administration were in favour of allowing the Japanese to keep the emperor system to induce so-called moderates within the Japanese government to work for the termination of the war. However, Truman was mindful of American public opinion, which wanted unconditional surrender as revenge against Pearl Harbor and the Japanese atrocities.

Bearing in mind those atrocities, it's clear that Japan doesn't have a leg to stand on when it comes to immoral acts in the war. However, one atrocity does not make another one right. I believe this was the most righteous war the Americans have ever been involved in, but you still can't justify using any means to win a just war.

.....
Tsuyoshi Hasegawa is emeritus professor of history at the University of California at Santa Barbara. His books include *Racing the Enemy: Stalin, Truman, and the Surrender of Japan* (Harvard University Press, 2005)



Abject misery

American and Filipino prisoners of war during the 1942 Bataan Death March in the Philippines. Some historians cite Japanese atrocities such as these when discussing the decision to drop the bomb



"Yes. The moral failing was Japan's"

says Michael Kort

Truman's decision to use the atomic bomb was the best choice available under the circumstances, and it was therefore morally justifiable. It was clear that Japan was unwilling to surrender on terms even remotely acceptable to the US and its allies, and the country was preparing a defence that was far more formidable than the US had anticipated.

The choice was not, as is frequently argued, between using an atomic bomb against Hiroshima and invading Japan. No one on the Allied side could say with confidence what would bring about a Japanese surrender, as Japan's situation had been hopeless for a long time. It was hoped that the shock provided by the bombs would convince Tokyo to surrender, but how many would be needed was an open question. After Hiroshima, the Japanese government

had three days to respond before Nagasaki, but they did not do so. Hirohito and some of his advisers knew Japan had to surrender, but they were not in a position to get the government to accept that conclusion. Key military members of the government argued it was unlikely that the US could have a second bomb and, even if it did, public pressure would prevent its use. The bombing of Nagasaki demolished these arguments and led directly to the imperial conference that produced Japan's offer to surrender.

The absolutist moral arguments (such as not harming civilians) made against the atomic bombs would have precluded many other actions essential to victory taken by the Allies during the most destructive war in history. There is no doubt that had the bomb been available sooner, it would have been used against Germany. There was, to be sure, a moral failing in August 1945, but it was on the part of the Japanese government when it refused to surrender after its long war of conquest had been lost. ■

.....
Michael Kort is professor of social sciences at Boston University. His most recent book is *The Vietnam War Reexamined* (Cambridge University Press, 2018)



OPINION

JAMES HOLLAND ON THE IMPORTANCE OF TACTICAL AIR POWER

/// A new level of professionalism had ultimately been achieved ///

At the end of June 1942, Britain's Eighth Army had just lost Tobruk and was in full flight back into Egypt and to the Alamein Line, just 60 miles

west of Alexandria. For a few days it looked as though they might be annihilated and lose Egypt and the Middle East. Thundering overhead, however, was the Desert Air Force, flying almost continual sorties day and night and absolutely hammering Rommel's pursuing Panzerarmee Afrika.

Unlike the Eighth Army, the Desert Air Force and the RAF Middle East as a whole was led by supremely able, charismatic and tactically brilliant commanders. Squadrons were operating close to the front, which allowed them more time over the battle space, and while in the air their ground crews were pulling back to the next landing ground, where fuel and ammunition dumps and spares had already been established. Aircrew would complete their sorties then do the same, effectively leap-frogging backwards.

With tough and experienced young squadron leaders at the helm, the Desert Air Force was able to give exceptional and dogged close air support, substantially slowing the Axis pursuit as a result – and with decisive consequences. The Eighth Army managed to get back to the Alamein line and regain its balance, never retreating again.

This was a key moment in the development of Allied air forces. Between the wars, the RAF had developed strategic forces – that is, air power that operated under its own steam. There was Bomber Command, Coastal Command and Fighter Command, each underlining the crucial role that Britain believed air power would play in future conflicts. In France in May and June 1940, however, it became apparent that not enough thought had been given to tactical air power – close air support for ground troops. When the war spread to north Africa, the

nature of tactical air power came to the fore once more.

It was two men, above all, who were the pioneers: Air Chief Marshal Sir Arthur Tedder, commander-in-chief of RAF Middle

East Command from June 1941, and Air Vice Marshal Arthur 'Mary' Coningham, who took charge of the Desert Air Force that September. Both men believed that the aim of tactical air power should be to win air superiority over the battle area, after which more direct support could be provided for the ground troops.

Their first major battle, however, was to insist that they, as airmen, should decide ground targets, not the army, arguing that its commanders did not understand air power nor fully appreciate that there might be other targets beyond what was immediately in front of the ground troops. The army, they suggested, should request targets to be hit and they, the air forces, would then oblige if they could – but the decision should always rest with them. In this they were quite correct and had Winston Churchill's full support.

With this doctrinal issue resolved, Tedder and Coningham not only set about developing new, highly aggressive, tactics, but a totally new system of supply, maintenance and structure. Coningham also suggested moving his headquarters into the field next door to that of the Eighth Army, something to which the army's new leader, General Bernard Montgomery, readily agreed. Tactical air power then played a decisive role in defeating Rommel's last thrust at Alam al-Halfa at the end of August 1942, and a vital part in the British victory at Alamein a couple of months later.

Tedder and Coningham created a template from which a further expansion of air power could be developed. Now arriving into the north African theatre were the Americans, who, like Britain, had also placed air power at the centre of their strategy for the war. Fortunately, the US Army Air Forces (USAAF) were also commanded by dynamic, forward-thinking and charismatic commanders, and together, over Tunisia, the RAF and USAAF learned how to combine tactical and strategic air power to great effect. The heavy bombers would fly deep and attack enemy infrastructure and lines of supply, while the tactical air forces would provide closer air support.

More than 2,000 Axis aircraft were destroyed over Tunisia, and by May 1943, some 3,000 Allied aircraft were hammering fewer than 300 of the Axis. A new level of professionalism had ultimately been achieved, a foundation for further development established, and tactical air power had become absolutely integral to driving the ground forces towards final victory. ■

.....
James Holland is a historian, author and broadcaster. His latest book is *Sicily '43: The First Assault on Fortress Europe* (Bantam Press, 2020)



Desert victors

Close air-ground cooperation helped Allied commanders Broadhurst, Coningham, Montgomery, Alexander, Tedder and Kuter (L–R) secure eventual victory in north Africa

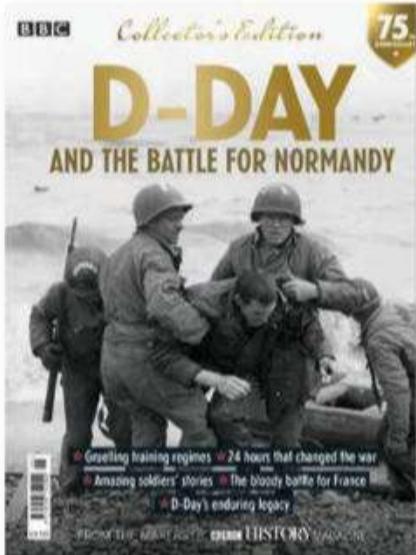
MORE FROM US

Read more about the Second World War at historyextra.com/period/second-world-war

Collector's Editions

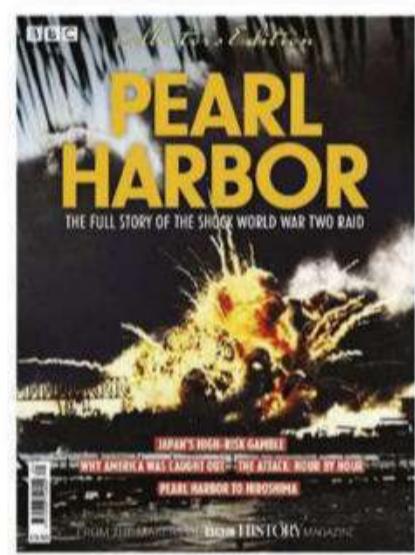
FROM THE MAKERS OF **BBC** **HiSTORY** MAGAZINE

ONLY
£9.99
EACH
WITH FREE
UK P&P*



D-Day and the Battle for Normandy

This unique special edition delves into the dramatic events of 6 June 1944 and reveals how the Allies liberated France.



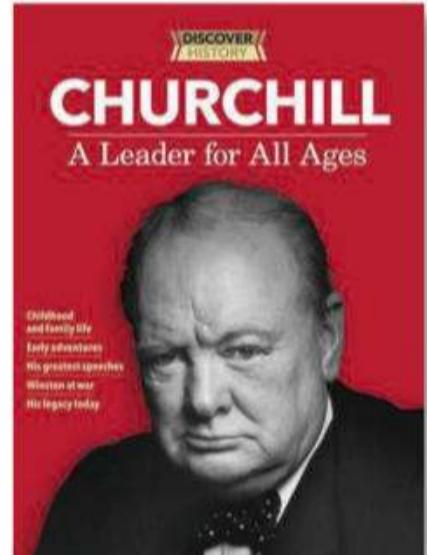
Pearl Harbor

Featuring articles written by top military historians, this new publication tells the story behind the devastating Japanese air attack that propelled the US into the Second World War.



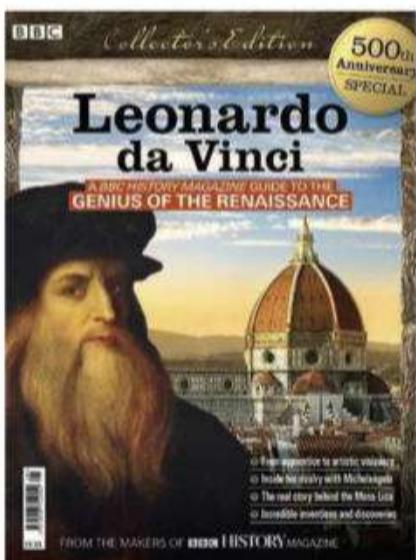
Nazi Germany

In this special edition, a range of historians provide remarkable insights into Germany's Third Reich, uncovering the dark history of Hitler's regime.



Churchill

This unique and comprehensive special edition explores the dramatic life of Britain's iconic Second World War leader.



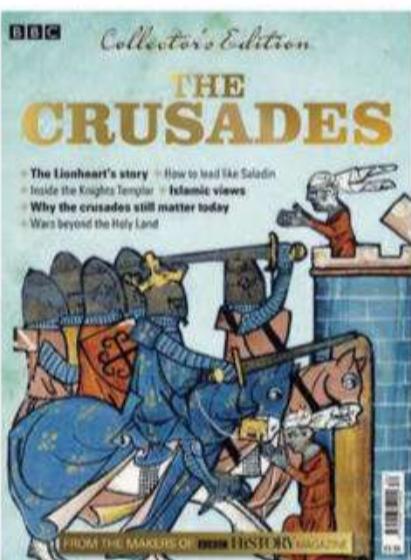
Leonardo da Vinci

Marking 500 years since his death, this fascinating new publication investigates the life and career of history's most famous polymath.



The Story of the Elizabethans

This in-depth special edition looks at how the era of exploration, entertainment and empire had a darker side, where poverty, violence and persecution plagued the lives of ordinary people.



The Crusades

Discover the stories behind these infamous medieval religious wars across Europe, the Holy Land and beyond, including details of the fascinating relationship between Richard the Lionheart and his adversary Saladin.



The Story of the Victorians

Explore the Victorian period, from 1837 to 1901. This special edition features a timeline of milestones, explorations into the lives of ordinary people, and a look at key characters from the time.

Order online www.buysubscriptions.com/historyspec
or call us on **03330 162 138⁺** and quote HIST PORTFOLIO PRINT 1

+ Calls from landlines will cost up to 9p per minute. Call charges from mobile phones will cost between 3p and 55p per minute but are included in free calls packages. Lines are open 8am–6pm weekdays and 9am–1pm Saturday (for orders only).

* Subscribers to BBC History Magazine receive FREE UK postage on these special editions. Prices including postage are: £11.49 each for all other UK residents, £12.99 each for Europe and £13.49 each for rest of world. Please allow up to 21 days for delivery

Bring your **BACKSTORY TO LIFE™**

Ancestry helped me discover
my great-grandfather Henry.

In 1904, Henry was a paperboy.
Ten years later, he went to war
and was featured in the paper
himself, commended for bravery.

I didn't know my great-grandad
Henry... But now I do.

**Bring your backstory to life
with a 14-day free trial!**

T
 **Ancestry®**

One free trial per person. Must register with credit or debit card. Unless you cancel before end of free trial you will be charged for your selected membership. Membership auto renews at the end of each membership period, unless notified otherwise. If you do not wish to renew cancel at least 2 days before renewal by visiting My Account or calling 0800 404 9723.